DOCUMENT RESUME

ED 121 750 95 SP 010 011

AUTHOR Murray, Stephen L.; And Others
TITLE Research Utilizing Problem Solving: Outcome Evaluation Report. Improving Teaching Competencies Program.
INSTITUTION Northwest Regional Educational Lab., Portland, Oreg.
SPONS AGENCY National Inst. of Education (DHEW), Washington, D.C. Basic Skills Group. Learning Div.
PUB DATE Feb 76
CONTRACT NE-C-00-3-0072
NOTE 157p.; For related documents, see SP 010 009-010

EDRS PRICE MF-$0.83 HC-$8.69 Plus Postage
DESCRIPTORS Elementary Education; Evaluation Methods; Inservice Programs; *Inservice Teacher Education; Intermediate Grades; *Performance Based Teacher Education; *Problem Solving; *Program Evaluation; Questionnaires; Teacher Education; Teacher Improvement; *Teacher Workshops; Teaching Skills
IDENTIFIERS *Research Utilizing Problem Solving

ABSTRACT

This report presents data collected about the impact of the Research Utilizing Problem Solving (RUPS) instructional system on the classrooms of teachers trained in two RUPS workshops, which were part of the Improving Teaching Competencies Program at the Northwest Regional Educational Laboratory. The report is divided into four chapters, the first of which describes the RUPS action-research model, as well as the history, objectives, and components of this instructional system. The second chapter briefly outlines the impact study/outcome evaluation; describes the evaluation procedures, methodology, instruments and data analyses; and presents the relevant evaluation questions. The third chapter presents and discusses the results of the impact study, and the fourth chapter summarizes the findings and results. Appended are (1) stages of evaluation and product development of the Improving Teaching Competencies Program; (2) instruments used in the RUPS evaluation study; (3) a discussion of the psychometric evaluation of the problem solving orientation questionnaire; (4) descriptions and psychometric data for climate scales used in the evaluation of RUPS, Interpersonal Influence, and Group Process Skills; (5) uncorrelated t-values for RUPS posttraining and the followup questionnaire; and (6) responses to the followup questionnaire. A summary of the outcome evaluation report is also included. (RC)

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ED121750

RESEARCH UTILIZING PROBLEM SOLVING: OUTCOME EVALUATION REPORT

Improving Teaching Competencies Program

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February 1976

Northwest Regional Educational Laboratory
Portland, Oregon 97204

SP 010 011

February 1976

Published by the Northwest Regional Educational Laboratory, a private nonprofit corporation. The work upon which this publication is based was performed pursuant to Contract NE-C-00-3-0072, with the Basic Skills Group/Learning Division of the National Institute of Education. It does not, however, necessarily reflect the views of that agency.

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PREFACE

This publication is one of a series of technical evaluation reports issued by the Northwest Regional Educational Laboratory to document evaluation findings for selected products. The subject of this report is *Research Utilizing Problem Solving (RUPS)*, an instructional system developed in the Improving Teaching Competencies Program.

This technical report presents the data collected about the impact of the system on the classrooms of teachers trained in two *RUPS* workshops. The information is intended to provide evidence related to the impact of *RUPS* training on students. Although this information is primarily summative in nature, it should also help those who may be considering modifying the system to increase the likelihood of achieving impact on students.

An institutional technical review has been conducted by Laboratory specialists external to the Program and qualified evaluation consultants external to the Laboratory have also reviewed this report.

Lawrence D. Fish
Executive Director

ACKNOWLEDGMENTS

The design implementation and reporting of a contracted evaluation effort such as the present study requires and the combined time and attention of a number of people without whom such studies would not be possible.

Therefore, the authors wish to thank the following members of the Improving Teaching Competencies Program who at one time or another contributed significant efforts to the execution of this study:

Dick Arends	Chic Jung
Pam Cutting	Dean Nafziger
Ruth Emory	Saralie Northam
Dorothy Erpelding	René Pino
Cathy George	Marilyn Rieff
David Green	Nick Smith
Sue Hiscox	Bill Ward

The following NWREL evaluators who reviewed the designs and final report offered helpful criticism and suggestions:

Joan Goforth	Bob Silverman
Harry Fehrenbacher	Blaine Worthen
Jim Sanders	

The external reviewers who provided us with very useful criticism and commentary on the *RUPS* study included:

James Barclay	Wells Hively
Robert Ellison	Barak Rosenshine
Ann Duncan Hively	Herbert Walberg

Able data processing assistance was provided by Mike Northam.

Finally, we wish to thank the 107 teachers and over 1,500 students who participated in the evaluation of *RUPS*.

INTRODUCTION

The overall goal of the Improving Teaching Competencies Program (ITCP) of the Northwest Regional Educational Laboratory (NWREL) as given in its *Resource Allocation and Management Plan* (ITCP, 1974) is: "To develop instructional systems for training school personnel in process skills which will promote student self-understanding, self-sufficiency and independence." The *RAMP* further specifies that:

> These instructional systems will be competency based low cost and mass diffusible for preservice and inservice training in: (a) supportive curricular materials which encourage pupils to be active learners; (b) verbal behaviors that enable students to derive personally usable meanings for what they learn; (c) analyzing and improving individual teaching styles and using problem sovling processes; (d) using basic interpersonal skills; (e) providing for continuous growth of teachers and contributing to increased functional capabilities of organizations.

This report focuses on the *Research Utilizing Problem Solving (RUPS)* instructional system, one of several instructional systems developed by the Improving Teaching Competencies Program in accordance with these goals. Based upon summative evaluation data, this technical report provides information and judgments for the benefit of potential users of the system.

Purpose of the Technical Report

This document reports on the outcome phase of the process employed in the development of *RUPS*. The development of this instructional system was based on a model which divides the work flow into five phases: Planning, Pilot, Interim, Field Test, and Outcome. Each phase consists of specified development, evaluation, and field relation activities which differ according to the phase under consideration. A brief description of the model is provided in Appendix A.

In the final or outcome phase, it is assumed that the development of the instructional system has been completed, and interest is focused on a summative evaluation of the system's ability to produce not only specified short-term outcomes, but also long-term outcomes. Short-term outcomes include the categories of participant satisfaction, skill acquisition, awareness, and immediate performance change. Long-term outcomes include retention of knowledge and information, and the general impact of the instructional system on secondary audiences such as students and/or peers. In this sense, the terms "impact study" and "outcome evaluation" are used interchangeably throughout this report.

The purpose of this technical report, then, is to present the results of the outcome evaluation/impact study. Although the evaluation was conducted primarily for the purpose of assessing the long-term outcomes of *RUPS*, some short-term outcomes are also addressed. The technical report of the outcome evaluation of the *RUPS* instructional system will fulfill the contractual agreements of the Improving Teaching Competencies Program of NWREL with its funding agency, particularly those agreements related to the development and evaluation of *RUPS*.

Audiences for the Technical Report

Several potential audiences have been considered in the planning and implementation of the outcome evaluation of the *RUPS* system and in the preparation of this report. It is anticipated that the information contained in this evaluation report will be relevant to the concerns of three groups:

1. Personnel in the Improving Teaching Competencies Program at at NWREL who are responsible for possible revisions or extensions of the systems

2. Educators who may potentially use the system and who need valid and reliable information in order to choose among inservice educational alternatives. These educators may include the teachers who desire to become workshop participants, curriculum specialists, or those who provide training opportunities for teachers

3. Members of the National Institute of Education (NIE) who monitor the progress and assess the quality of output from the Improving Teaching Competencies Program

Report Format

This report is organized into four chapters. The first chapter described the *RUPS* action-research model, as well as the history, objectives, and components of this instructional system. The second chapter briefly outlines the impact study/outcome evaluation; the evaluation procedures, methodology, instruments and data analyses are described, and the relevant evaluation questions are presented. The third chapter presents and discusses the results of the impact study. The fourth chapter presents a summary of findings and results.

CHAPTER ONE: DESCRIPTION OF THE *RUPS* INSTRUCTIONAL SYSTEM

Rationale for the Development of the *RUPS* System

In 1965 Miles identified "problem solving adequacy" as a key variable for "organizational health." In 1967 the Flint Youth Study (Lippitt) of the University of Michigan cited action research procedures emphasizing an objective data base for decision making as a primary need for school district personnel. In 1971 Cross reported a study at the AERA annual meeting which showed that principal's decision-making patterns are reactive, rapid and probably strongly influenced by subordinates.

Studies such as these were taken as evidence of the need for the development of a systematic approach to problem solving as a means of encouraging improvement in schools. While numerous new teaching strategies and materials have been introduced into the schools, they have had the effect of allowing teachers more freedom and perhaps providing more pressure to attend to the functions of analyzing, diagnosing and identifying general problem areas as well as individual learner problems. However, the studies mentioned above indicated that more structured work was needed in these difficult functional areas. These studies also implied that educators needed instruction not only in developing skills of analysis, diagnosis, and identification of problem areas, but also in integrating and applying their knowledge to initiate improvements in their educational environments.

Based on this information, the developers of *Research Utilizing Problem Solving (RUPS)* concluded that an instructional system was needed which would deal with strategies for relevant problem solving and could be readily adapted to the needs of both teachers and students.

The *RUPS* instructional system was thus developed to aid the improvement of the problem solving capacity of the schools and school personnel. It was the intent of the developers that the problem solving procedures *RUPS* offers would contribute to the improvement of the general quality of education as well as provide a means for increased individualization and other forms of instructional improvement.

The *RUPS* Process

RUPS was designed as a low-cost mass-diffusible instructional system intended to improve the problem solving effectiveness of educators and people working in related capacities. The target population for *RUPS* is primarily teachers and administrators. However, school board members, paraprofessionals, professors, and state department of educational personnel may also derive some benefit from *RUPS*. Generally, *RUPS* is intended to be of use to any members of the above groups who have a problem they are working on, or a problem which is of concern to them.

An action-research model forms the basis of *RUPS*. The *RUPS* instructional system was designed to help educators plan and manage learning experiences more efficiently by providing training in action-research procedures. The procedures involve learning and using skills in applying objective data and research findings to solve local problems and to achieve improvements in schools and classrooms.

The *RUPS* action-research process is intended to be applicable when the problem solver senses a problem, but is unclear about the kind of outcome that is required or desired. The process is based on a 5-step method of problem solving. These steps are:

1. Identify a concern
2. Diagnose the situation

3. Consider action alternatives

4. Test selected alternatives

5. Adopt and diffuse

The first step involves applying available knowledge and consists of identifying the problem in terms of who or what causes it and who or what is affected by it. Step two demands a thorough diagnosis of the problem situation. The various forces that work for or against perpetuation of the problem are considered in this step. Once the relevant forces have been identified, in step three action alternatives are formulated. This is accomplished through brainstorming--a kind of avalanche-style verbalization of ideas. Brainstorming is followed by feasibility testing. During step four, brainstormed ideas are examined to determine which one(s) might work best. The final step include the adoption and diffusion of the alternative(s) identified during brainstorming. A possible result of these actions may be the generation and identification of new knowledge and concern(s) which in turn may be used to identify other problems. Thus, the entire *RUPS* process is cyclical. *RUPS* is intended to be a problem-solving process that not only offers logical solutions to problems but is also effective in uncovering problems that may, in a sense, be camouflaged by related concerns.

Goals and Objectives of the *RUPS* System

The previous section briefly described the action-research process which forms the basis of the *RUPS* instructional system. The overall goal of *RUPS* is:

> The improvement of educational systems by using problem solving processes to identify problems and generate and effect solutions that are relevant to the needs of both local school systems and individuals

To accomplish this end, *RUPS* has two main objectives:[1]

> To introduce and instruct participants in the use of the *RUPS* process as a means of working toward improvements in their school setting
>
> To provide participants with opportunities to experiment with and experience ways of increasing teamwork skills that can facilitate problem solving in school environments

The developers of *RUPS* identified a number of activities which focus on the skills and behaviors expected to be demonstrated by educators participating in *RUPS* training. Since these activities form the basis of the 5-step *RUPS* process, performance of these activities is necessary for the accomplishment of the goals and objectives of the system. The activities have thus been organized by the evaluators and developers of the system to correspond to the two objectives stated above. This presentation is not intended to be prescriptive, nor are the two categories mutually exclusive. Rather, the activities can be loosely categorized in terms of: (a) those that emphasize the development of specific task-oriented skills and behaviors related to the action-research techniques and procedures, and (b) those that emphasize the development of interpersonal (teamwork) skills and behaviors. The activities that comprise the *RUPS* process are:

1. Task orientation skills:

   Applying the four guideline criteria for writing a problem statement

---

[1]Previous development and evaluation documents have identified other statements as the objectives, goals and purposes of the *RUPS* system. It is the opinion of the authors that these differences are basically semantic and no real difference of opinion as to the goals of this system exists. The authors feel, however, that the organization and presentation of goals and objectives in this section offers a more coherent and logically consistent picture of the intent of the *RUPS* instructional system than given earlier.

Using force-field diagnostic techniques

Selecting and creating instruments for data gathering

Spotting and analyzing major results of data collected

Using criteria for deriving implications from research findings

Applying guidelines for planning and implementing action alternatives

Evaluating solution plans

Planning a backhome project

Conducting a backhome *RUPS* project

Brainstorming action alternatives to meet implications derived from findings

2. Interpersonal (teamwork) skills:

Paraphrasing interpersonal communications

Diagnosing teamwork relations

Identifying one's personal style of operationalizing dimensions of teamwork behaviors

Utilizing concepts and skills of giving and receiving feedback

Using the *RUPS* or action-research process, teachers and students can adapt the above activities to promote improvements in classrooms and schools more effectively.

Content of the *RUPS* System--A Brief Description

The *RUPS* instructional system was designed to provide training for educators in skills of using objective data and research findings as they apply a process of action-research to achieve local improvements. This training is accomplished by guiding participants through a structured sequence of subsets or units, each consisting of a series of concept papers, group discussions, and exercises. These units are designed with the intent of developing the participants' knowledge

and abilities to apply this process to the identification and diagnosis of classroom, school or peer-related problems.

The instructional strategy of the *RUPS* system is based on a pattern of repeated objective diagnosis carried out in small training groups of three or six persons. The knowledge gained through this process provides the basis for the selection and design of action plans to solve the identified problems. A simulation exercise provides opportunities for participants to practice skills in training groups and learn to observe and improve their actual teamwork behaviors in the workshop setting. In other words, participants train each other using criteria provided in the materials. Basic interpersonal and group teamwork skills are stressed in relation to the participants' efforts to apply the *RUPS* problem solving process to the simulation problem.

In the simulation, the workshop participants learn to use the *RUPS* model as they:

Help Mrs. Jones analyze her classroom situation in which the students apparently do not want to learn

Select data gathering instruments and process results of data gathered to rediagnose the problem

Create a plan to enable her children to become more active learners

The "Mrs. Jones" simulation is a primary training tool for the presentation of the *RUPS* process. The simulation and the accompanying activities and discussions provide opportunities for *RUPS* participants to familiarize themselves with the 5-step process, gain experience and understanding in the use of specific action-research procedures and techniques, and share their knowledge with their training group.

Once a number of subsets are completed participants begin to concentrate on their own real problems by planning a *RUPS* project to

be implemented in their own schools, thus working toward whatever goals are relevant to them personally.

Although the vehicle for communicating information and directing activities remains relatively stable in the *RUPS* system (i.e., the use of concept papers, structured activities related to the simulation, and group discussions to convey information), each subset differs from the others in terms of both its specific objective(s) and content. For further information, refer to the *RUPS* leader's manual as well as previous development and evaluation plans (Butman, Jung and Rothlind, 1972).

Product Design

A total of 33½ training hours is required to complete the *RUPS* instructional system. Training is conducted in a workshop setting. The instructional strategy calls for one 27½-hour workshop and two three-hour followup sessions held six and twelve weeks subsequent to training.

The *RUPS* instructional system is composed of 16 sequential and cumulative subsets of training units. The participant's manual is arranged in accordance with this sequence. The developers of *RUPS* warn against identifying and isolating specific activities and concepts from the system since it should result in the loss of certain features built into the system for the expressed purpose of reinforcing previously learned knowledge and effecting an integration of that knowledge with new knowledge. For this reason, the system's developers emphasize its cumulative and sequential nature and caution against any deviation from the prescribed instructional strategy.

The time allotted for the completion of each unit varies; the average time is approximately two hours per unit. Each training unit

begins with a statement of the subset's purpose and objectives. There is then an agenda or list of steps the participants will go through to complete the unit. The information in each subset is conveyed through the use of concept papers, activities, and group exercises.

At the beginning of the workshop, the leader distributes a set of materials to each participant. The materials include a booklet on data gathering instruments (Fox, Luszki and Schmuck, 1966) and the training manual which contains all the handouts with the exception of those concerned with the simulation. These latter handouts are removed from each manual and are distributed by the leader at the appropriate times indicated in the leader's instructional strategy. (The leader's manual differs from the trainees' manual only in that the leader's manual includes an instructional strategy for each step.)

The instructional strategy is very specific concerning the leader's role in the training. The workshop leader is responsible for giving directions, passing out materials, presenting charts, reviewing the agenda of each subset and clarifying instructions. The leader operates a tape recorder in the early training units, times the exercises and occasionally leads a group discussion concerning the progress of the workshop. The design of the instructional system does not call for the workshop leader to be an expert in either the *RUPS* process or teamwork skills. The instructional strategy does not include any activities where the leader directly instructs the participants in the skills they are learning. Instruction is provided by the interaction of the participants with each other in the exercises.

The instructional strategy for each training unit is in the leader's manual. It includes a listing of the steps and the materials needed for each, the approximate amount of time each step should take

to be completed, and detailed directions for the participants. To aid the leader's preparation, there is additional information concerning the specific intent of each activity and steps within each subset. This includes a statement of purpose for the subset, the objectives, the rationale for the inclusion of each step as it is found in the design, and a list of all materials for the subset.

Continuous active participation is effected during the workshop through the use of the simulation described earlier. The simulation is geared primarily to teachers at the elementary school level and experience. The entire design emphasizes participant practice with skills of the 5-step *RUPS* problem solving process.

Developmental History of *RUPS*

The original prototype for *RUPS* was created over a 3-year period between 1966 and 1969. Many of the basic concepts in *RUPS* were derived from earlier work of Kurt Lewin which were then transmitted by Ronald Lippitt to the senior developer, Charles Jung. Mark Chesler and Robert Fox at the Center for Research on the Utilization of Scientific Knowledge of the Institute for Social Research, University of Michigan, provided important contributions to the development of the instructional system by exploring the assumptions of this training design. Much of the interpersonal content of the system and generalizations underlying the design were derived from the work of the Cooperative Project for Educational Development (COPED) of the National Training Laboratories.

The first attempt to implement a complete design of the *RUPS* instructional system was made in collaboration with the National Board of Education of the Methodist Church. The next opportunity to further

develop the system came in connection with the COPED project. Funding was provided by the Research Training Branch of the United States Office of Education. Training during this stage was conducted with the Brooklyn, Jackson, Levonia, and Detroit public school districts of Michigan.

In 1968, the National Association of Classroom Teachers (ACT) supported the testing of the instructional system at three successive annual conventions. It was at this time that the "Mrs. Jones" simulation was introduced into the training design. An attempt also was made to further explicate the system through an analysis of the objectives of the training. This study was conducted by René Pino under the supervision of Robert and Elizabeth Corrigan. The Corrigans conducted a major field evaluation of *RUPS* as part of an ESEA Title III project in the Atascadero, California, public schools.

On the basis of their experiences with the *RUPS* instructional systems in the contexts described above, the developers decided to make several revisions in the training materials. Several of the concept papers were rewritten, the role of group dynamics in the training was emphasized, and the section on the backhome improvement project was added.

The final revisions of the materials were accomplished in 1970 by a cooperative venture involving Northwest Regional Educational Laboratory, National Education Association, Oregon Education Association, Washington Education Association and Central Washington State College. The resulting product was entitled *Research Utilizing Problem Solving: Classroom Version.* A companion edition for administrators was entitled *Research Utilizing Problem Solving: Administrator's Version.* A field test for this *RUPS* version was conducted in 1971. These results have been reported in *Technical Report No. 7: Research Utilizing Problem Solving* (Butman, Jung and Rothlind, 1972).

CHAPTER TWO: DESIGN OF THE IMPACT STUDY

The purpose of this chapter is to summarize the evalution design for the *RUPS* outcome evaluation/impact study. Implementation decisions concerning the design of the *RUPS* impact study were influenced by a variety of situational constraints. As a result, the evaluation design as it was implemented differs from the design proposed for this impact study.

There are four sections in this chapter. The major evaluation questions are given in Section I. Section II discusses the instruments used in this study. The subjects of the study are described in Section III, and the procedures used in carrying out the impact study will be discussed in Section IV.

Evaluation Questions

This section lists the major long-term and short-term outcome questions to be addressed in this report. The focus of these questions is on participant satisfaction, use and subsequent effects of the knowledge and skills learned by participants in *RUPS* rather than on the mere acquisition of knowledge and skills. The questions have evolved from discussions with program developers about their intent for the *RUPS* instructional system and from analysis by program evaluators of what would provide rigorous, yet reasonable, tests of the system.

It is assumed that all of these questions, which have been sorted into two categories in Table 1, will be of interest to both developers and potential users of the instructional system. The sources of information and the data collection methods are identified in Table 1; on the right side of the page the procedures for analyzing and reporting information for each evaluation question are designated.

Table 1

Evaluation Questions for the *RUPS* Impact Study

Questions	Information	Data Collection Methods	Analysis and Reporting Procedures
Questions Related to the Quality and Acceptability of the Content, Strategies, and Materials for the Instructional System			
Do trainees report satisfaction with the content, strategies and materials of the *RUPS* instructional system?	*RUPS* Trainees	Posttraining Questionnaire	Descriptive Summary
Do these perceptions persist over a 3-month period?		Followup Questionnaire	Descriptive Summary, t-Tests
Do trainees perceive the training in *RUPS* as being useful and applicable to their work?	*RUPS* Trainees	Posttraining Questionnaire	Descriptive Summary
Do these procedures persist over a 3-month period?		Followup Questionnaire	Descriptive Summary, t-Tests
What are the side effects that result from the use of the system?	Observers, Evaluators, Users	Informal Observations, Weekly Log	Summary of Findings
Does *RUPS* compare advantageously to competitive ways of meeting the same outcome objectives?	ERIC	Literature Search	Summary of Findings
Questions Related to Long-Range Training Effects			
Attitudinal Effects:			
Do trainees' perceptions of their working understanding of the material change over a 3-month period?	*RUPS* Trainees	Posttraining and Followup Questionnaires	t-Tests
Do *RUPS* trainees change in their orientations toward problem solving?	*RUPS* Trainees	Problem Solving Orientation Questionnaire	t-Tests
Do *RUPS* trainees become more able to identify problems that need attention and more willing to attend to problem solving in a systematic way than do teachers who have not received training?	*RUPS* Trainees, Comparison Group	Problem Solving Orientation Questionnaire	Path Analysis
Behavioral Effects:			
Do *RUPS* trainees discuss their problem solving knowledge and skills in their local schools?	*RUPS* Trainees	Weekly Log	Descriptive Summary
Do *RUPS* trainees use their problem solving knowledge and skills in their local schools?	*RUPS* Trainees	Weekly Log	Descriptive Summary
Impact on Secondary Groups:			
Does *RUPS* training result in changes in classroom climate?	*RUPS* Trainees	School Activities Questionnaire	t-Tests
Do *RUPS* trainees involve their students in problem solving activities more than do teachers who have not received training?	Students of *RUPS* Trainees, Students of Comparison Group Teachers	School Activities Questionnaire	Path Analysis

The pattern of relationships among outcome measures is addressed through the technique of path analysis (Spaeth, 1975). Evaluating the impact of teacher training on students often requires the definition of a sequence of outcome measures which allow the training activities to be linked with student outcomes. When there are well defined student objectives, evaluating the impact of teacher training is straightforward.

If student objectives are missing, as they were for *RUPS*, evaluators must use what information is available to infer a sequence of training effects. Such an inferred sequence of effects bears a strong resemblance to model building. It follows that evaluating the evaluators' model becomes a significant aspect of the study.

Path analysis is an analytic technique useful in explicating the evaluators' assumptions and in empirically evaluating its efficacy. It also has potential for formative evaluation as it may help identify "weak links" in the chain of effects expected to result from training. It was for these reasons that path analysis was used in the present evaluation study.

Instrumentation

The formats and purposes of the instruments used for the collection of data will be discussed in this section. All questionnaires with the exception of the School Activities Questionnaire (SAQ) were administered and explained by the evaluator observing the workshop. Sample copies of all instruments can be found in Appendix B.

Background Questionnaire. This instrument was developed by evaluation staff of the Improving Teaching Competencies Program to assess various demographic and attitudinal variables of participants. The variables under consideration were: age, sex, employment position,

educational background, previous workshop experience, expectations for the workshop, and reasons for attending the workshop. Responses were written directly on the questionnaire and were later processed by trained coders.

Problem Solving Orientation Questionnaire (PSOQ). This instrument was designed as a paper-and-pencil self-report measure of the orientation of teachers toward problem solving. In the questionnaire respondents are presented with a variety of realistic problem situations and asked to estimate the probability of their behaving or reacting in a manner consistent with the view of problem solving advocated through *RUPS* training. Responses to items are made on a 5-point multiple-choice scale identical to that in the following sample item:

> Suppose something has gone wrong in your school--something that affects everyone and has everyone upset. What are the chances that you would remain quiet and wait for others to analyze the problem?
>
> 1. Almost none (less than a 10 percent chance)
> 2. Maybe (about a 25 percent chance)
> 3. Possibly (about a 50 percent chance)
> 4. Almost always (about a 75 percent chance)
> 5. Definitely (greater than a 90 percent chance)

The items from the PSOQ were categorized according to two classification schemes determined by the content of the situation presented in the item stem. The first classification scheme divides the situations described in the PSOQ into two categories: (a) situations dealing primarily with interpersonal relationships, and (b) situations dealing primarily with task accomplishments.

The second classification scheme also divides the situations described in the PSOQ into two categories: (a) situations related to classroom problem solving activities, and (b) situations related to

nonclassroom problem solving activities. Scores for each set of items were the sum of the responses to each item within that category.

Two developers of the *RUPS* instructional system and four evaluators who had never received *RUPS* training were instrumental in assigning the items to the categories described above. Each developer and evaluator received a complete PSOQ, with each item printed on an index card. They were instructed to work independently and assign items dealing with task accomplishment or interpersonal relationships. Items which the evaluators and developers could not unanimously assign to these two categories were not scored. Of the thirty-one items in the PSOQ, only two were eliminated because of lack of unanimity. Twelve items were classified as tasks and seventeen as interpersonal relationships.

The same procedure of sorting cards was followed for the classroom and nonclassroom categories. Twelve items were placed in the classroom situation category, seventeen items were placed in the nonclassroom situation category, and two items were deleted due to lack of unanimity.

Data from a sample of 87 teachers who responded to the PSOQ were used to calculate split half reliabilities, which were corrected with the Spearman Brown Prophecy formula. These 87 teachers were either participants in *RUPS*, participants in two other NWREL workshops, or members of the control group used in the present study. Their pretest data were used to calculate the split half reliabilities.

In addition to the split half reliabilities, test-retest reliabilities were computed with the same group of 87 teachers. Since the test-retest reliabilities were based upon pretest and posttest administrations designed to assess training effects, the test-retest reliabilities should be interpreted as conservative estimates of stability. Table 2 includes both the split half and test-retest reliability estimates.

Table 2

Reliabilities of PSOQ Scales

PSOQ Scale	Split Half	Test-Retest
Task Accomplishment	.71	.61
Interpersonal Relationships	.37	.44
Classroom Situation	.60	.61
Nonclassroom Situation	.38	.44
Total Score	--	.59

The task accomplishment and classroom situation scales were more reliable than the interpersonal relationships scale or the nonclassroom situation scale. The former two scales are more useful for evaluation purposes. The test-retest reliability for the total score on the PSOQ shows moderate stability for an instrument of this type.

Since items appeared in more than one scale across classification schemes (but not within classification schemes) it is only appropriate to examine scale intercorrelations within classification schemes. The Pearson product moment correlation between the task accomplishment and interpersonal relationships scale was .55 for the pretest data and .54 for the posttest data. The classroom situation scale and the nonclassroom situation scale were intercorrelated .32 on the pretest and .34 for the posttest. These correlations are statistically significant at the .05 level or greater. It is noteworthy that the pretest intercorrelations and posttest intercorrelations between the two scales in each classification scheme were almost identical. Further information on the psychometric properties of the PSOQ is presented in Appendix C.

School Activities Questionnaire (SAQ). The SAQ is a multiple-choice questionnaire designed to measure various aspects of classroom climate.

The SAQ used in this evaluation study was based upon the *Student Activities Questionnaire*, an instrument under development by the Institute for Behavioral Research in Creativity, (Ellison, Callner and Fox, 1972). It was composed of four of the original eight subscales. Four subscales were chosen as being most sensitive to the problem solving behaviors of the teacher, based on information of how past trainees had used the training in their classroom. The subscales were: (a) reinforcement of self-concept, (b) individualization of instruction, (c) democratic classroom control, and (d) classroom participation.

The following is a description of the subscales and scores used in the SAQ. The items in each subscale were keyed on an *a priori* judgmental basis directed toward the critical concept behind each subscale. The score for each subscale is a total of all item scores in that subscale.

1. Reinforcement of Self-Concept. This score measures the student's perception of the amount of positive feedback received by the student, either through personal contact or structured class activities. It is also a measure of the student's feelings concerning the feedback. Students with high scores in this area indicate that their teacher frequently talks to them individually about their work, offers encouragement for difficult tasks, and gives frequent positive feedback for good performances. These students also report that they feel encouraged when they receive feedback and consequently develop pride in their school work. In addition to positive teacher contact, students also report that they have frequent class activities where they have the opportunity to give each other feedback regarding good work.

2. Individualization of Instruction. This score measures the extent that students perceive their teachers as sensitive to their own individual needs, progress, and goals. High scores in this area reflect students who talk privately with their teachers about themselves and their school work and report that their teachers are sensitive to their strengths and weaknesses and the kinds of activities they enjoy. They further indicate that the difficulty level of their classwork is neither too hard nor too easy and that activities are most often individualized to meet the needs and abilities of each student.

3. Democratic Classroom Control. This score is a measure of student input into classroom decision making, planning of individual activities and enforcement of rules. Students with high scores in this area report that they are allowed frequent input through discussions and planning activities and that such decisions are made through the joint effort of teacher and students. They also indicate that their teacher will permit a noisy classroom during many activities and stresses student participation rather than authoritarian control.

4. Classroom Participation. This score measures student participation in classroom activities. The individual items in the score involve frequency of classroom discussions, number of students that typically participate, and opportunities for participation in the classroom. High scores in this area indicate frequent class discussions and activities where many students are called upon or given the opportunity to speak. They also indicate that students have the opportunity to work with a variety of other

students on group projects and are often given the opportunity to teach each other.

5. Climate Composite. This score was an unweighted sum of the four scales of the SAQ. Reliabilities for the four SAQ scales and the climate composite were calculated on data collected in the present investigation by two techniques. The intraclass correlation (Haggard, 1958) which is a simultaneous measure of within classroom agreement and between classroom variability was used as the first measure of reliability. These reliabilities are shown in Table 3. The intraclass correlation coefficient is a function

Table 3

Reliabilities of SAQ Scales

SAQ Scale	Test-Retest[a]	Intraclass Correlations	
		Pre[b]	Post[c]
Reinforcement of Self-Concept	.28*	.36**	.27*
Democratic Classroom Control	.45**	.79**	.72**
Individualization of Instruction	.12	.21	.33**
Classroom Participation	.59**	.72**	.58**
Climate Composite	.42**	.57**	.49**

[a]Number of classrooms = 73, number of students = 1213.
[b]Number of classrooms = 84, number of students = 1499.
[c]Number of classrooms = 73, number of students = 1213.
*p < .05.
**p < .01.

of within group and between group variation of student responses and constitutes a measure of consistency or reliability. As such, it is a measure of reliability using the classroom as the unit of analysis. Intraclass correlations were computed for both the

pretraining data and the posttraining data. The second reliability estimate used was a standard test-retest reliability. As is true for the PSOQ reliabilities discussed above, these test-retest reliabilities must be considered as conservative estimates because of the intervening treatment. SAQ reliabilities estimated are presented in Table 3. An intercorrelation matrix including the four scales and the climate composite from the SAQ and 13 other climate scales used in the evaluation of Improving Teaching Competencies Program workshops is presented in Appendix D.

Posttraining Questionnaire. The purpose of this questionnaire was to assess participants' perceptions of their learning experience. Items were grouped to measure specific areas. These areas related to (a) judgments about the success of the workshop in achieving its goals, (b) self-report of understanding of conceptual materials and acquisition of skills, and (c) feelings about the usefulness of the workshop for self and others.

Part I of the questionnaire is composed of statements concerning the success of the workshop in meeting its goals. Participants responded on a 5-point rating scale ranging from 1 ("not at all successful") to 5 ("completely successful").

Part II consisted of a list of activities and skills. Participants were asked to rate their "working understanding" of those skills on a 4-point scale. The scale range was:

1	2	3	4
I don't understand the concept and could not apply the skills	I don't understand the concept but could apply the skills	I understand the concept but could not apply the skills	I understand the concept and could apply the skills

Questions concerning the satisfaction of the participants with the workshop and their perceptions of its usefulness were posed in Part III. Participants responded on a 5-point scale.

The Problem Statement. One of the activities of the *RUPS* workshop is the planning of a "backhome" *RUPS* project. Using the *RUPS* model, participants composed problem statements. These statements described the project or problems that participants anticipated undertaking in their local school settings. Statements were collected from all participants for use in this evaluation.

The Weekly Log. The Weekly Log is an instrument of self-report of problem solving activities. With this instrument each trainee indicated weekly the number of times he or she had engaged in various problem solving activities. The Weekly Log was composed of two forms. Form 1 included a list of fourteen behaviors or activities specified in *RUPS* training. Participants were asked to estimate the frequency with which they engaged in these problem solving activities during the preceding week. This form of the Weekly Log was intended to be completed and returned in an enclosed self-addressed, stamped envelope every Friday for nine weeks, October 25 through December 20.

Form 2 of the Weekly Log was concerned with the nature of the problems the participants had been working on during the preceding two weeks. Every problem worked on required an additional Form 2 since a participant may have worked on several problems during a two-week period. This form also included questions concerning the progress individuals had made on their problems and the difficulties or successes they had encountered. Form 2 was submitted together with Form 1 of the Weekly Log every other week.

Followup Questionnaire. The Followup Questionnaire was a modified version of the Posttraining Questionnaire. It covered the same three areas, but from the viewpoint of "now that three months have passed since you received *RUPS* training, how do you feel about . . ." All

but one of the questions were multiple-choice options; responses were recorded on an additional optical scanning data sheet. One open-ended question was asked concerning the participants' perceptions of the usefulness of the *RUPS* training.

Subjects of the Study

RUPS Treatment Group. The target population for the *RUPS* instructional system is primarily teachers, and recruitment efforts for this study focused on this group. All fourth, fifth, and sixth grade teachers from each of the two test areas were invited to participate in the *RUPS* workshop. These teachers were offered free materials, training, and paid tuition for three hours of graduate credit in return for their cooperation in providing data and information relevant to the evaluation. Specifically, participants were asked to agree to:

1. Attend every session in its entirety
2. Participate in data collection during the workshop
3. Allow approximately 30 minutes for the collection of information from students in classrooms
4. Keep a weekly log of problem solving activities for three months following the training

It was originally anticipated that one major test site, Tacoma, Washington, would be used for the *RUPS* impact study. Due to a teachers' strike in mid-September, however, the Tacoma school district decided to withdraw from the study. As a consequence, it became necessary to look elsewhere for subjects to participate in this study.

As part of the general recruitment effort in Tacoma, recruitment procedures had already been initiated in several school districts south of Tacoma. A number of subjects from these districts had signed up to participate in the *RUPS* workshop prior to the withdrawal of the Tacoma

school district. When the Tacoma districts withdrew from the study, the decision was made to use the subjects from the districts south of Tacoma and to recruit subjects from a second major site in Seattle.

Based upon considerations of the distance between the two test sites and the difficulties in commuting to and from the sites, arrangements were made to conduct workshops at both sites; one workshop was conducted in Tacoma for the participants from the districts south of Tacoma, and a second workshop was conducted in Bellevue for the participants from the Seattle area. The combined results of both workshops were used in the analysis of data and interpretation of the results.

Comparison Group. The original evlauation design called for a comparison group as well as an experimental group. The comparison group was to have been randomly selected from those teachers who volunteered for *RUPS* training. The physical distance between the two workshop sites and the relatively small number of participants at each site mitigated against this, however. The decision was made to provide *RUPS* training for all participants at each site and explore alternative means of providing comparative data.

An evaluation study involving two other experimental groups and a control group was scheduled to be conducted in the Seattle area two weeks before the *RUPS* workshop. Two groups were to receive training in the *Interpersonal Influence (INF)* and the *Group Process Skills (GPS)* instructional systems, which are two other instructional systems developed by the Improving Teaching Competencies Program of NWREL. The third group was a nontreatment control group which was to receive training in the *Interpersonal Influence* instructional system the following Spring.

The target populations for the *GPS* and *INF* instructional systems are also primarily teachers. Recruitment procedures for these groups

were the same as those for the *RUPS* groups. Subjects for the *GPS*, *INF* and nontreatment control group were recruited from all fourth, fifth and sixth grade teachers in the Seattle area. For these reasons teachers who were members of the nontreatment control group also served as the comparison group for the evaluation of *RUPS*.

It was felt that comparison of test results from this group with the *RUPS* group would provide useful information, particularly in addressing questions directly related to the issue of impact of training. For this reason and for reasons of cost and availability of subjects, it was considered feasible to use the nontreatment group as the comparison group for the *RUPS* instructional system.

Group Sizes. The total number of participants in both the treatment group and the comparison group is shown in Table 4. Table 4 also provides a breakdown of the total group into individual workshop groups.

Table 4

Treatment and Comparison Group Sites

Treatment Group	N	Comparison Group	N
RUPS: Tacoma	17	Control	24
RUPS: Bellevue	21		
Total	38		

Description of Treatment and Comparison Group. Both groups completed a Background Questionnaire. Information collected included sex, age, occupation, years of teaching experience and education of the participant. Additional participant information concerning previous NWREL workshop experience and reasons for attending the workshop was also obtained. The responses of both the comparison group and the *RUPS* treatment group on all background variables are summarized in Table 5.

Table 5

Distribution of Participant Characteristics by Group

Characteristic	*RUPS* Treatment Group		Control Group	
	Percentage	N	Percentage	N
Sex:				
Male	34.2	13	41.7	10
Female	63.1	24	58.3	14
No response	2.6	1	0	0
Age:				
Under 25	2.6	1	4.2	1
25-34	47.4	18	41.6	10
35-44	18.4	7	12.5	3
45-54	18.4	7	20.8	5
55-64	5.3	2	16.7	4
64 and over	0	0	0	0
No response	7.9	3	4.2	1
Occupation:				
Elementary School Teacher	100.0	38	91.7	22
No response	0	0	8.3	2
Years Teacher Experience:				
0	2.6	1	4.2	1
1-3	13.2	5	4.2	1
4-6	18.4	7	12.5	3
7-10	15.8	6	25.0	6
11 or more	50.0	19	50.0	12
No response	0	0	4.2	1
Highest Degree Obtained:				
BA	73.7	28	58.3	14
MA	18.4	7	37.5	9
Ph.D.	0	0	0	0
No response	7.9	3	4.2	1
Number of Previous NWREL Workshop Experiences:				
0	73.7	28	79.1	19
1	23.7	9	0	0
2	2.6	1	4.2	1
3	0	0	16.7	4
Reasons for Workshop Attendance:				
Satisfies a requirement or gives credit	63.2	24	54.2	13
Others were attending	2.6	1	8.3	2
Superiors suggested I go	5.3	2	8.3	2
Superiors gave me the opportunity	7.9	3	4.2	1
I was selected to attend	23.7	9	20.8	5
Attendance was paid for	52.6	20	33.3	8
I really wanted to learn	73.7	28	50.0	12
I had a particular problem	15.8	6	4.2	1
I heard . . .	10.5	4	25.0	6
Other	23.7	9	29.2	7

The proportionate distributions of responses for both groups are essentially similar. There were more females than males in each group. The average age of the *RUPS* participants was approximately the same as the average age of participants in the comparison group. The *RUPS* group had fewer years teaching experience as well as proportionately less people with master's degrees. Proportionately more people in *RUPS* had attended one or more NWREL workshops than in the comparison group, but more people in the comparison group had attended two or more NWREL workshops. The responses of the two groups to the item "Reason for Workshop Attendance" indicated that the three reasons most often given by both groups for attending the NWREL workshops are:

1. I really wanted to learn
2. Satisfies a requirement or gives credit
3. Attendance was paid for

In general, the participants' responses in both the *RUPS* and comparison group were similar for most of the variables under consideration.

Procedures

Data Collection Procedures and Schedule: *RUPS* Treatment Group.

The *RUPS* workshops were held on two consecutive weekends with two followup sessions six and twelve weeks later. The meetings were scheduled as follows:

October 11	6:00 p.m. to 10:00 p.m.
October 12, 13	8:30 a.m. to 5:00 p.m.
October 18	6:00 p.m. to 10:00 p.m.
October 19, 20	8:30 a.m. to 5:00 p.m.
December 7 and January 18	9:00 a.m. to 12:00 noon

The schedule for data collection was prepared prior to the workshop, based on previous evaluation work conducted by NWREL. All the data collected from participants were from paper-and-pencil questionnaires. An evaluator was present at each of the workshops and followup sessions to observe and document deviations from prescribed training designs, the degree of participant involvement, overall workshop climate and any apparent side effects. The data collection schedule is presented in Table 6.

At the first workshop meeting, participants were assigned identification numbers in order to insure confidentiality of responses. All data were identified and coded strictly on the basis of these ID numbers. At that meeting, prior to any training of the participants, two questionnaires were administered--the Background Questionnaire and the Problem Solving Orientation Questionnaire (PSOQ).

After participants completed the preliminary instruments, the workshop trainer introduced the materials. The prescribed training strategy as outlined in the trainer's manual was followed in the scheduling and presentation of materials for the entire weekend. Participants worked alone or in small groups of three to six.

On October 14, at the end of the first weekend of training, participants received a set of School Activities Questionnaires (SAQ) to be administered to their classes during the following week (October 14 through 18). Participants who had volunteered for *RUPS* training had been asked to arrange for a member of their school's professional or support staff to administer the questionnaire; teachers were cautioned not to be in the room when the questionnaire was administered as it was felt their presence might influence responses. Confidentiality of

Table 6

Data Collection Schedule

Instrument	Administration Dates	Data Field	Groups Collected From			
			RUPS	*GPS*	*INF*	Control
Background Questionnaire	*RUPS* Preworkshop Oct. 11 *Comparison* Preworkshop Sept. 27	Demographic and attitudinal values	X	X	X	X
Problem Solving Orientation Questionnaire (PSOQ)	*RUPS* Pretest Oct. 11 Posttest Oct. 22 *Comparison* Pretest Oct. 6 Posttest Jan. 30	Orientation of participants towards problem solving	X	X	X	X
School Activities Questionnaire (SAQ)	*RUPS* Pretest Oct. 14-18 Posttest Jan. 20-24 *Comparison* Pretest Sept. 27 Posttest Nov. 29	Administered to the classes of participants to measure students' perceptions of their teacher's problem solving activities	X	X	X	X
Posttraining Questionnaire	*RUPS* Postworkshop Oct. 20	Assessment of learning experience, attitudes towards workshop and expected utilization of skills	X			
Problem Statement	*RUPS* Postworkshop Oct. 20	Statement of participants "backhome" *RUPS* project	X			
Weekly Log	*RUPS* Postworkshop and nine weeks Oct. 25-Dec. 20	Frequency counts of problem solving activities and statements concerning the nature of the problem being worked on	X			
Followup Questionnaire	*RUPS* Jan. 18	Assessment of learning experience and participants' perceptions of positive and negative features of workshop	X			

responses was maintained as students were not required to sign their names and teachers were requested not to look at the response sheets. All questionnaires and answer sheets were then returned in a self-addressed, stamped envelope to NWREL where they were coded by the teacher's identification number.

The second weekend of training started on schedule. The strategy and training instructions presented in the trainer's manual were followed with some minor changes in response to individual and group needs and concerns.

On October 20, at the conclusion of the second weekend of training, participants completed the Posttraining Questionnaire and composed problem statements concerning their "backhome" *RUPS* project. These statements were collected by the evaluators at the workshops. Participants also received copies of the Weekly Log forms and instructions for their completion. Weekly Logs were completed and returned to NWREL in enclosed self-addressed, stamped envelopes every Friday for nine weeks, October 25 through December 20.

The followup sessions were designed to reinforce use of skills and problem solving techniques learned during *RUPS* training. Participants reported progress made on their backhome *RUPS* projects to their training groups and together brainstormed possible solutions. At both followup sessions the trainers followed the strategies and schedules prescribed by the trainer's manual with minor changes to allow for expression of individual needs and concerns. Observers were present at the sessions to record deviations from the prescribed training and any apparent side effects. No further data were gathered at the first followup session.

At the conclusion of the second followup workshop on January 18, the Followup Questionnaire was administered and the PSOQ was readministered. Participants also received a second complete set of the SAQ to be administered to their classes during the following week, January 20 through 24. The same procedures were followed in the administration of the posttest SAQ as were followed in administering the pretest.

Data Collection Procedures and Schedule: Comparison Group. The data collection schedule for the comparison group is also presented in Table 6, page 32. The nontreatment control group met once on September 27 for an orientation meeting. All participants completed Background Questionnaires on September 27.

It was prior to the first meeting that the NWREL evaluation staff was notified of Tacoma's decision to withdraw from the *RUPS* impact study. Arrangements were immediately made for the control group to provide the necessary comparative data. The PSOQ was mailed to the comparison group during the week of October 6.

The *GPS*, *INF* and nontreatment groups were involved in a study that included the administration of a classroom climate inventory to the participants' classes. The climate inventory was composed of a series of subscales, including the subscales of the SAQ used in the *RUPS* impact study; student responses to these particular subscales provided the comparative data for the *RUPS* study. Participants in the three groups received sets of climate inventories on September 27. It had been previously arranged that a member of the school's professional or support staff would administer the inventories. The inventories were returned in enclosed self-addressed envelopes by approximately October 11. This process was repeated on November 29 when complete sets of climate

inventories were mailed to all participants in this study. Administration procedures were the same and questionnaires were again returned in enclosed self-addressed envelopes by approximately December 20.

On January 3, the PSOQ was mailed to the participants in the *GPS* and *INF* workshops as well as members of the nontreatment group. Ninety-five percent of the questionnaires were returned by the end of January.

CHAPTER THREE: RESULTS AND DISCUSSION

The purpose of this chapter is to report the data that were collected in this study and to discuss this evidence from the perspective of the evaluation questions for the *RUPS* instructional system. This chapter is organized by evaluation question. The relevant data, analyses, and results are reported and discussed for each question.

Evaluation Questions Related to the Quality and Acceptability of the Content, Strategies, and Materials of the Instructional System

Do RUPS trainees report satisfaction with the training provided by the RUPS instructional system?

The relevant data for this question come from the Posttraining Questionnaire administered at the conclusion of the workshop. These results are presented in Table 7.

Sixty-five percent of the participants indicated they felt the workshop was successful in presenting clearly understandable definitions and descriptions of problem solving, and fifty-seven percent judged the workshop to be successful in providing clear information concerning the directions and rationales for the different sessions. The majority of participants rated the workshop as successful in demanding original thinking (83 percent); offering new insights, new ways of viewing old problems (84 percent); and helping them understand the role and possibility of problem solving in schools (87 percent). From results such as these it is inferred that the participants in the *RUPS* workshop were very satisfied with the content and structure of the training.

Seventy-three percent of the participants summed up their experience in the *RUPS* workshop as positive; the same proportion of

Table 7

Posttraining Questionnaire
Satisfaction

Questions		Scale Range Neg 1	2	Neut 3	4	Pos 5	Totals $\bar{X}$	SD	N
How successful do you feel the workshop was in:									
1. Providing clear information concerning directions and rationales for the different sessions?	n	1	1	14	18	3	3.57	.80	37
	%	2.7	2.7	37.8	48.6	8.1			
2. Offering new insights, new ways of viewing old problems?	n	1	1	3	19	13	4.14	.89	37
	%	2.7	2.7	8.1	51.4	35.1			
3. Addressing what you thought were important issues/vital concerns?	n	4	0	13	15	5	3.46	1.10	37
	%	10.8	0	35.1	40.5	13.5			
4. Demanding original thinking on your part?	n	1	0	5	23	7	3.97	.77	36
	%	2.7	0	13.9	63.9	19.4			
5. Presenting clearly understandable definitions and descriptions of problem solving?	n	1	2	10	19	5	3.68	.88	37
	%	2.7	5.4	27.0	51.4	13.5			
6. Helping you understand the role and possibility of problem solving in schools?	n	0	2	4	20	11	4.08	.98	37
	%	0	5.4	10.8	54.1	29.7			
7. Maintaining your interest throughout the workshop?	n	3	2	9	20	3	3.49	1.02	37
	%	8.1	5.4	24.3	54.1	8.1			
24. Meeting your expectations about what you personally wanted to get out of it?	n	2	1	11	16	6	2.36	.99	36
	%	5.5	2.8	30.6	44.4	16.7			
		Neg[a] 5	4	Neut 3	2	Pos 1	$\bar{X}$	SD	N
25. How clearly did you understand the workshop's overall objectives?	n	2	1	5	18	10	2.08	1.03	36
	%	5.5	2.8	13.9	50.0	27.8			
26. How successful do you feel the workshop was in achieving its overall objectives?	n	0	3	9	16	8	2.19	.89	36
	%	0	8.3	25.0	44.4	22.2			
29. Now that the workshop is over, how would you sum up the experience?	n	2	2	6	13	14	2.05	1.13	37
	%	5.4	5.4	16.2	35.1	37.8			
30. Would you recommend this workshop to a friend whose interests are like yours?	n	2	4	4	10	17	2.03	1.24	37
	%	5.4	10.8	10.8	27.0	45.9			

[a]The scale range for items 25, 26, 29 and 30 is reversed; 5 indicates the most negative score while 1 indicates the most positive score.

participants indicated that they would recommend *RUPS* to friends with similar interests. Seventy-eight percent of the participants responded that they understood the workshop's objectives, but somewhat fewer participants, sixty-seven percent, indicated they felt the workshop was successful in meeting its overall objectives.

Participants' ratings of the workshop appear to decline slightly when participants are asked to respond on a personal level. Although participants tended to rate the workshop positively on items from which satisfaction is inferred, responses tend to be somewhat less positive when participants make judgments on the basis of personal criteria. Only 54 percent of the participants responded positively when asked to rate the success of the workshop in addressing what they thought were important issues/vital concerns; 62 percent rated positively the workshop's success in maintaining their interest. When asked if they felt the workshop was successful in meeting their personal expectations, 61 percent of the participants responded positively.

These responses suggest there may be a relative dissatisfaction concerning the personal relevance of the workshop, which in turn may have affected the participants' rating of the workshop's success in maintaining their interest and meeting personal expectations. The average response for items reflecting personal feelings, particularly questions 3, 7 and 24, are somewhat lower than the scores of the other questions. Thus, assuming that satisfaction can be inferred from ratings of general success, the overall satisfaction ratings at the conclusion of the workshop are quite positive; all questions were rated positively by 60 percent of the participants or greater. But the results also suggest that if satisfaction were to be based solely

on ratings of questions soliciting personal opinions, the respondents would still be generally satisfied but somewhat less enthusiastic.

Do these perceptions persist over a 3-month period?

Some of the questions in the Followup Questionnaire, which was administered three months after the end of the workshop, could be matched to questions in the Posttraining Questionnaire. The responses to these matched questions were compared by means of uncorrelated t-tests.[1] Table 8 contains the appropriate Followup Questionnaire data. T-values for all items can be found in Appendix E.

The t-values for the tests performed on Items 33, 34, 40 and 43 were not significant. Thus, when questioned after a period of 3 months, *RUPS* participants tended to maintain their perceptions of the workshop's success in addressing important issues and vital concerns, presenting a clearly understandable description of problem solving, and achieving its overall objectives. There was no change in the percentage of participants who responded that they would recommend the *RUPS* workshop to friends and colleagues. The results indicated that after three months there was no significant change in the satisfaction ratings of *RUPS* participants on these variables.

The t-values for questions 32 ($t_{72} = -2.06$, $p < .05$) and 42[2] ($t_{72} = 2.962$, $p < .05$) indicated that there was, respectively, a negative change in the participants' perceptions of the workshop's success in offering new insights and ways of viewing old problems, and significantly fewer people summed up their workshop experience positively.

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[1]The rationale for using uncorrelated t-tests in similar situations is discussed in McNemar; *Psychological Statistics*, 1962, p. 85.
[2]The scale range for Item 42 is reversed.

Table 8

Followup Questionnaire
Satisfaction

Questions		Scale Range					Totals		
		Neg 1	2	Neut 3	4	Pos 5	$\bar{X}$	SD	N
How successful do you feel the workshop was in:									
32. Offering new insights, new ways of viewing old problems? (2)[a]	n	1	3	12	12	9	3.68	1.03	37
	%	2.7	8.1	32.4	32.4	24.3			
33. Addressing important issues, vital concerns? (3)	n	2	5	13	16	1	3.24	.93	37
	%	5.4	13.5	35.1	43.2	2.7			
34. Presenting a clearly understandable description of problem solving? (5)	n	3	2	11	15	6	3.51	1.10	37
	%	8.1	5.4	29.7	40.5	16.2			
		Neg[b] 5	4	Neut 3	2	Pos 1	$\bar{X}$	SD	N
39. Compared to other workshops you have attended, how successful do you feel this workshop was in meeting your expectations about what you personally wanted to get out of it?	n	3	6	3	18	2	2.73	1.07	37
	%	8.1	16.2	21.6	48.6	5.4			
40. How successful do you feel the workshop was in achieving its overall objectives? (26)	n	1	4	10	21	1	2.54	.84	37
	%	2.7	10.8	27.0	56.8	2.7			
42. Now that the workshop is over, how would you sum up the experience? (29)	n	1	15	16	12	2	2.75	.87	36
	%	2.8	13.9	44.4	33.3	5.6			
43. Would you recommend this workshop to any of your friends or colleagues? (30)	n	2	5	5	14	11	2.27	1.19	37
	%	5.4	13.5	13.5	37.8	29.7			
44. In relation to your expenditure of time and/or money, how valuable has the workshop been to you?	n	1	4	9	16	7	2.35	2.01	37
	%	2.7	10.8	24.3	43.2	18.9			

[a]The numbers in parentheses indicate matching items from the Posttraining Questionnaire.
[b]The scale range for items 39, 40, 42-44 is reversed; 1 indicates the most positive score while 5 indicates the most negative score.

These results indicate that the tendency for participants to respond less positively when questioned on a personal level is continued. The workshop participants have, presumably, been using *RUPS* for three months. Based on their experiences they have developed a more realistic understanding of *RUPS*, its strengths, and its limitations. But whereas participants tend to respond less positively when judging the workshop on personal criteria, their attitudes about the training and quality of the materials have not changed.

Do trainees perceive the training in RUPS as being useful and applicable to their work?

The information source for this question is the Posttraining Questionnaire. The results are presented in Table 9. The majority of the participants, 84 percent, responded that they felt the workshop was successful in helping them understand the role and possibilities of problem solving in schools, and 81 percent rated the skills and concepts of *RUPS* as useful. Fifty-seven percent responded that they planned to use *RUPS* as an integral part of their work. From these results it is inferred that, immediately after the workshop, participants tended to perceive training in *RUPS* as both useful and applicable to their work.

This result was further illuminated by questions regarding the applicability of *RUPS* to specific groups. A large proportion of participants, ranging from 57 percent to 79 percent, saw *RUPS* as applicable and useful in work with students, teachers and others, but only half, 49 percent, of the participants saw *RUPS* as useful and applicable to work with superiors. This would suggest that whereas the trainees could visualize the role and usefulness of *RUPS* training, skills and concepts in dealing with students, teachers, and others, they were less sure of

Table 9

Posttraining Questionnaire
Utilization and Application

Questions		Scale Range Neg 1	2	Neut 3	4	Pos 5	Totals $\bar{X}$	SD	N
How successful do you feel the workshop was in:									
6. Helping you understand the role and possibility of problem solving in schools?	n	0	2	4	20	11	4.08	.80	37
	%	0	5.4	10.8	54.1	29.7			
8. Providing useful skills and concepts for working with others outside your professional life?	n	0	3	8	17	8	3.83	.88	36
	%	0	8.3	22.2	47.2	22.2			
9. Providing information with practical application for your work with students?	n	1	1	6	20	9	3.95	.88	37
	%	2.7	2.7	16.2	54.1	24.3			
10. Providing information with practical application for your work with teachers?	n	2	0	14	20	1	3.49	.80	37
	%	5.4	0	37.8	54.1	2.7			
11. Providing information with practical application for your work with superiors?	n	1	4	14	17	1	3.35	.82	37
	%	2.7	10.8	37.8	45.9	2.7			
		Neg[a] 5	4	Neut 3	2	Pos 1	$\bar{X}$	SD	N
27. How useful do you feel the skills and concepts you have learned are in problem solving?	n	0	2	5	14	15	1.83	.88	36
	%	0	5.5	13.9	38.9	41.7			
28. In all honesty, how much do you plan to use the ideas, skills, and/or materials presented in this workshop as an integral part of your work?	n	1	2	13	21	0	2.54	.73	37
	%	2.7	5.4	35.1	56.8	0			

[a]The scale range for items 27 and 28 is reversed; 1 indicates the most positive score while 5 indicates the most negative score.

its use and applicability (although the responses were still in a positive direction) to their work with superiors. However, this result may be due to the fact that the *RUPS* materials are geared for classroom use. Thus, it would seem reasonable that participants found it more

useful in that setting. Since the relationship of *RUPS* to work with superiors is less clear, it is quite possible that fewer people would see its applicability.

Do these perceptions persist over a 3-month period?

The data sources are the matching items from the Posttraining Questionnaire and the Followup Questionnaire. The results are presented in Table 10. Uncorrelated t-tests were performed on all items in Table 8, page 41. T-values are presented in Appendix E. Item 36 ($t_{72} = -2.10$, $p < .05$) was the only item found to have changed significantly, indicating that there was a significant decrease of perceived success of the workshop in providing information with practical applications for work with students.

Table 10

Followup Questionnaire
Utilization and Application

Questions		Scale Range Neg 1	2	Neut 3	4	Pos 5	Totals $\bar{X}$	SD	N
How successful do you feel the workshop was in:									
35. Providing useful skills and concepts for working with others outside your professional life? (8)[a]	n	2	6	9	14	6	3.43	1.12	37
	%	5.4	16.2	24.3	37.8	16.2			
36. Providing information with practical application for your work with students? (9)	n	1	7	10	12	7	3.46	1.10	37
	%	2.7	18.9	27.0	32.4	18.9			
37. Providing information with practical application for your work with teachers? (10)	n	2	4	8	17	6	3.57	1.07	37
	%	5.4	10.8	21.6	45.9	16.2			
38. Providing information with practical application for your work with superiors? (11)	n	2	5	16	12	2	3.19	.94	37
	%	5.4	13.5	43.2	32.4	5.4			

[a]The numbers in parentheses indicate matching items from the Posttraining Questionnaire.

In addition there was an open-ended question on the Followup Questionnaire which asked, "Now that you have been away from the workshop for three months, have you changed your opinion about how useful it was?" A complete list of participant responses is provided in Appendix F.

These results indicate that *RUPS* trainees, when questioned three months after the workshop, did not change their positive perceptions of the usefulness and applicability of *RUPS* training in relation to work with teachers, superiors and others. The tendency for participants to be less sure (in comparison with their responses relating to teachers and others) of the usefulness and possible applications of *RUPS* to work with their superiors was continued. However, the participants' ratings of the usefulness and practicality of *RUPS* for work with students decreased although the responses remained positive. This change, however, is not totally unexpected. In the three months since the workshop, trainees have had the opportunity to use the *RUPS* process and experiment with the skills and concepts in their classroom. The participants' responses may reflect a more realistic understanding of *RUPS* process based on their classroom experiences with it. Participants have apparently learned to adjust their expectations of the practical application and usefulness of *RUPS* to the daily demands and limitations of their work situations.

When questioned directly about their opinions of the usefulness of the workshop, 88 percent of the participants responded that their opinions had not changed since the workshop. Their elaborations of their responses to this open-ended question generally indicated positive attitudes toward the *RUPS* process and its components. This measure of self report generally supports the results of the Followup

Questionnaire items; opinions of the usefulness of *RUPS* generally did not change, although participant opinion about the usefulness of *RUPS* for work with students did change.

What are the significant side effects that result from the use of the system?

The data sources for this question are the observations of the evaluators/observers who were present at each workshop site and the results of Form 2 of the Weekly Log.

A side effect of *RUPS* training that was observed and documented at both the conclusion of the workshop and at the two followup sessions was the high degree of participant enthusiasm for the training. The observers attributed this enthusiasm to two causes: (a) the success of the training in providing a novel perspective and alternative way(s) of approaching problem solving, and (b) the reinforcing interpersonal dynamics of the training/learning groups.

Another possible side effect of the training was observed in participant responses to Form 2 of the Weekly Log. These results indicated that *RUPS* participants tended to select relatively complex problems for their improvement projects that required commitments of at least one month's time for their completion. The majority of people (70 percent) reported working on the same improvement project for at least one month. However, as there were no comparative data for these results, it is not possible to determine whether this effect is indeed due to *RUPS* training and not the reactive effect of this data gathering instrument.

Does RUPS compare advantegously to competitive ways of meeting the same outcome objectives?

A limited Educational Resources Information Center (ERIC) search was conducted for the purpose of identifying problem solving training packages or instructional system that offered alternatives to *RUPS*. Using the descriptors, "problem solving, action research, force field analysis, workshops, teacher workshops, systems anlaysis, systems approach, and systems concepts," the search identified 74 references.

This search indicated that many individuals and consulting organizations have included *RUPS*-like problem solving techniques as resources in their work. It provided evidence of the development of a variety of materials for single, short-term activities (half-days or less) based on force field analysis, action research, or systems approach to problem solving. *Twenty Exercises for the Classroom* developed by the NTL Learning Resources Corporation (Mill, 1972) is an example of this type of effort. In this sense, many of the training packages identified in the search are comparable to *RUPS* in that at least some of their activities and problem solving activities are like those used in *RUPS*. The concepts and activities surrounding action research and force field analysis are by no means unique to *RUPS*.

In terms of complete and comprehensive prepackaged training programs that emphasize both problem solving and interpersonal and group dynamics (as does *RUPS*), we were unable to identify any alternatives to the *RUPS* instructional system. While a variety of commercially available systems and activities exist that have some objectives in common with *RUPS*, our search did not provide evidence for any comprehensive and comparable systems that could provide competitive ways of meeting all the training objectives of the *RUPS* instructional system.

However, this does not imply that there are no critical competitors which accomplish the same outcomes as *RUPS*; it only implies that these materials are not available as training packages.

Questions Related to Long-Range Training Effects

To evaluate training in terms of outcomes or effects achieved is a complicated undertaking. One of the problems which complicates the task is disagreement over the type of training that is most useful or has the greatest impact. This disagreement may be due largely to differences in the values applied to the training systems. Is it more useful to develop efficient forms of training that are of limited applicability or broadband forms of training that may be applied in a variety of situations? In the opinion of the evaluators and as supported by external evaluation reviews, *RUPS* falls in the second of these two categories.

To evaluate the effects of *RUPS*, then, is similar to evaluating graduate courses in such areas as research methodology, techniques of counseling, and approaches to management. When the values to be applied deal with impact on clients, whether they be students, patients, or subordinates, the primary evaluation problem is to choose the outcomes on the basis of an explicit rationale.

There are at least three options for choosing evaluative criteria. The first is on the basis of specific objectives dealing with client behavior. While this would clearly be appropriate in the efficiency oriented training program, broadband training programs frequently do not have such objectives.

A second basis for choosing impact criteria is by authoritative decree. For example, standardized achievement test data may be used

to evaluate teacher training programs because someone in a position of power has demanded that they be used. If the logical links between the training and these criteria are nonexistant, a costly empirical study may not be warranted.

A third alternative is to select outcomes based on a model predicting the expected impact on students. This technique was chosen in the *RUPS* impact evaluation. Since selecting criteria and developing a design based upon a model involve a series of inferences, an explanation of these inferences is provided through the vehicle of path analysis. Path analysis was chosen as an analytic model because it makes explicit the theoretical assumptions underlying the evaluation design.

The first step in applying path analysis is to create a graphic display of the hypothesized causal relations operating among a set of variables. A general path display for evaluating *RUPS* is presented in Figure 1. The lines connecting sets of variables represent hypothesized causal relationships between the connected variables, while the arrows indicate the direction of the assumed causation. Figure 1 makes clear the assumption that the final outcome measure in the sequence is directly or indirectly determined by all of the preceding variables, not just training. This is particularly important since randomization was not achieved in the present investigation. Figure 1 is a general display from which a series of path diagrams may be derived. A path diagram contains specific variable levels whereas a general path display may include categories of variables as terms. Categories of variables included in the general path display are teacher attitude, teacher behavior, and student attitudes.

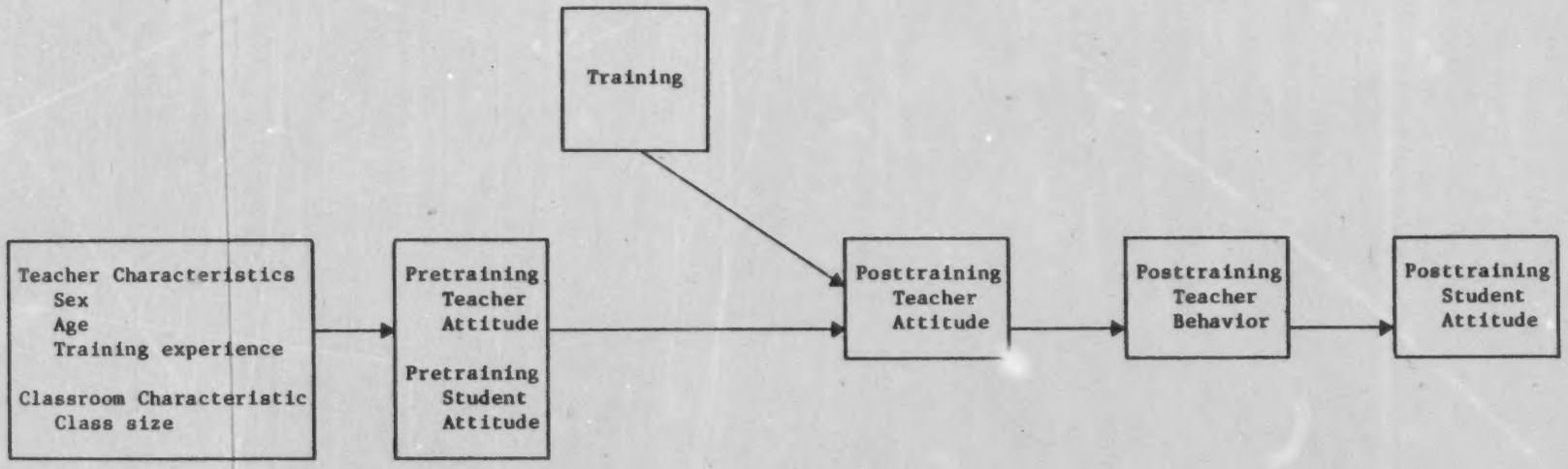

Figure 1. General Path Model for the *RUPS* Impact Study

The evaluation questions which are addressed in the remainder of this report can be placed within the context of this general path model. It should be noted that formal path analysis procedures were not applied in addressing all of the evaluation questions which follow, but the model is intended to reflect the logic in the order in which the questions are addressed.

Attitudinal Effects. The data sources for the following evaluation question correspond to sections of the Posttraining and Followup Questionnaires that assessed participant perceptions of their "working understanding" of workshop skills and concepts.

Do trainees' perceptions of their working understanding of the materials change over a 3-month period?

Table 11 presents these data and a statistical analysis by means of correlated t-tests.

The mean score on all items on the Posttraining Questionnaire was greater than three, suggesting that a majority of participants felt they understood the materials but did not feel that they could apply the skills immediately after training. These data indicated a general confidence on the part of the *RUPS* participants with regard to their working understanding of the skills and concepts of *RUPS* training, but participants appear to be less confident of their ability to apply the skills.

Similar results were obtained three months later when the items were readministered on the Followup Questionnaire. Only the item assessing the participants' working understanding of "spotting and analyzing major results of data collected" was found to have changed significantly. This change was in a positive direction indicating that

Table 11

Knowledge Items:
Posttraining versus Followup Questionnaires Correlated t-Tests

Questions	Posttraining $\bar{X}$	Posttraining SD	Followup $\bar{X}$	Followup SD	Difference $\bar{X}$	Difference SD	t-Value	df
How well do you feel you have a working understanding of:								
Applying the 4-guideline criteria for writing a problem statement	3.69	.58	3.63	.84	-.06	.68	-.49	34
Using the force field diagnostic technique	3.92	.28	3.83	.45	-.09	.51	-1.00	34
Selecting and creating instruments for data gathering	3.63	.55	3.60	.65	-.03	.86	-.20	34
Using criteria for deriving implications from research findings	3.24	.96	3.26	.79	.02	1.14	.15	33
Spotting and analyzing major results of data collected	3.33	.74	3.64	.55	.31	.81	2.15	32
Brainstorming action alternatives to meet implications derived from findings	3.68	.68	3.65	.69	-.03	.63	-.27	33
Applying guidelines for planning and implementing action alternatives	.312	.96	3.17	1.04	.05	1.21	.28	34
Evaluation solution plans	3.12	.91	3.47	.66	.35	1.07	1.92	33
Paraphrasing interpersonal communications	3.71	.67	3.71	.57	0	.80	0	34
Using concepts of giving and receiving feedback	3.68	.73	3.79	.54	.11	.81	.85	33
Diagnosing teamwork relations	3.56	.75	3.59	.66	.03	1.00	.17	33
Identifying and evaluating small group dynamics	3.29	.94	3.44	.79	.15	1.26	.68	33

[a]The following scale was used:
1 = I don't understand the concept and could not apply the skills
2 = I don't understand the concept but could apply the skills
3 = I understand the concept but could not apply the skills
4 = I understand the concept and could apply the skills

the participants' perceptions of their ability to apply this skill had increased. This effect may be due to participants' use of the data gathering instruments provided in the workshop and the three months of practice and classroom experience *RUPS* trainees had had since the workshop. As a result of their use of both the instruments and the *RUPS* process, participants may have had more confidence in their performance of *RUPS* skills and activities. Thus, the data indicate that trainee perceptions of their working understanding of the workshop materials and concept were very positive when assessed immediately after the workshop, and generally did not change over a 3-month period.

Do RUPS trainees change in their orientation toward problem solving?

It was hypothesized that as a result of training, participants in *RUPS* would report an increased probability of engaging in problem solving behavior in a variety of situations. This hypothesis was tested using the four PSOQ scales administered prior to and three months following the workshop. Correlated t-tests were performed on the data. The results are presented in Table 12.

Table 12

Correlated t-Values
PSOQ--*RUPS* Treatment Group

Variable	Pre $\bar{X}$	Pre SD	Post $\bar{X}$	Post SD	Difference $\bar{X}$	Difference SD	t-Value	df	p-Value
Classroom Situations	36.35	6.18	40.11	4.85	3.76	5.35	3.94	36	.01
Nonclassroom Situations	47.49	5.22	47.30	4.94	-.19	5.17	-.22	36	.39
Task Accomplishment	35.24	6.50	37.97	5.65	2.73	5.99	2.77	36	.01
Interpersonal Relationships	49.54	5.01	50.30	5.20	.76	5.02	-.92	36	.26

The data indicate a statistically significant increase in the self-reported probabilities of engaging in problem solving activities for two of the four subscales: classroom situations and task accomplishment. The training was apparently instrumental in changing participants' dispositions too, or their perceptions of their dispositions to engage in probelm solving behaviors in the classroom and specific tasks. Both presumably impact directly on a participant's problem solving attitude toward, as well as behavior in, schools and classes. However, it is possible that the same variable is being measured by both scales as these two scales contain many of the same items. A variable from the combined scales may be referred to as participant orientation toward task related problem solving in the classroom. The t-values for the other two scales were not significant. *RUPS* training apparently did not affect participant perceptions of their interpersonal problem solving orientations or orientations to problems other than classroom related problems. While these differential results may be explained by the strong classroom orientation of the *RUPS* materials, there is an equally compelling psychometric reason for such a finding. Reference to the technical appendix on the psychometric characteristics (Appendix C) will clearly show that the reliabilities of the two scales that did not show change were much lower than for the scales that did show change.

> *Do RUPS trainees become more able to identify problems that need attention and more willing to attend to problem solving in a systematic way than do teachers who have not received training?*

It was hypothesized that the posttraining orientation toward problem solving of participants in the *RUPS* workshop would be greater than the posttraining orientation among members of the nontreatment control groups.

This question was addressed through the technique of path analysis. The path diagram reflecting the model employed is presented in Figure 2. Figure 2 is derived from the model presented in Figure 1, page 50.

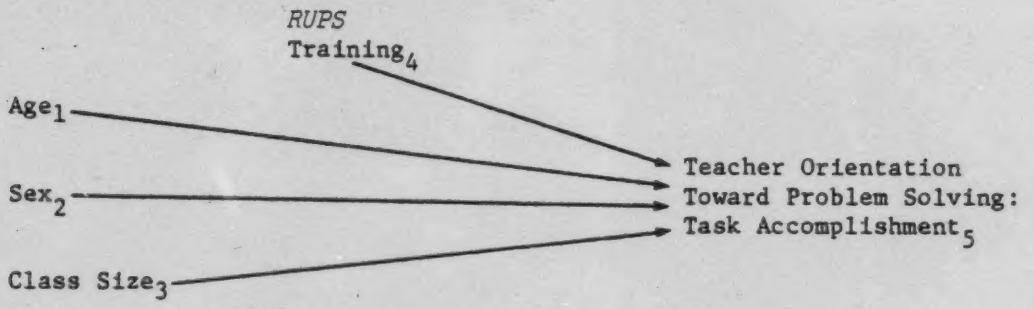

Figure 2. Path diagram for evaluating the effect of *RUPS* training on teacher orientation toward problem solving.

Variables were selected for this path diagram on the basis of a number of considerations. The most important variable is the teacher attitude measure concerning task accomplishment, which was chosen for the path analysis because of its relatively high reliability in comparison to other PSOQ scores. The *RUPS* training variable (dummy variable where *RUPS* = 1 and control = 0) is included as the measure of treatment. Additional variables thought to influence teacher attitude were age, sex, and class size. It is assumed that these four independent variables were all measured very reliably, and, thus, were appropriately included in the path diagram.

The regression equation corresponding to this path diagram is as follows:

$$Z_5 = P_{5,1}Z_1 + P_{5,2}Z_2 + P_{5,3}Z_3 + P_{5,4}Z_4 + P_{5,a}Z_a$$

By solving this linear regression equation it is possible to make estimates of the direct effects (path coefficients) of prior variables

upon subsequent variables. While these path coefficients do not in themselves indicate causality they can be used to assess whether or not the data are consistent with a prior causal model. Table 13 presents the standardized partial regression coefficients or path coefficients for each of the variables in Figure 2 and the multiple correlation obtained for explaining posttraining teacher orientation toward problem solving: task accomplishment.

Table 13

Multiple Correlation and Standardized Partial Regression Coefficients for Explaining Posttraining Teacher Orientation Toward Problem Solving: Task Orientation[a]

Exogenous Variable	Multiple Correlation	Standardized Partial Regression Coefficient	p-Value
Age	.46	-.50	.01
Sex		-.23	.19
Class Size		.21	.23
Training		-.16	.37

[a]Only subjects for whom there were complete data were used in this analysis. (N=26, *RUPS*; N=10, Control; N=36, Total)

It is apparent through examining Table 13 that *RUPS* training did not have any direct effect on teacher orientation toward problem solving as the corresponding coefficient was -.16. The multiple correlation resulting from regressing posttraining teacher orientation toward problem solving: task accomplishment on the four variables in the path model was .46. The only significant path coefficient was for age ($p < .01$), indicating that younger teachers saw themselves as having stronger orientations toward problem solving.

Behavioral Effects. The information from Form 1 of the Weekly Log was used to answer the following two-part question.

> *Do RUPS trainees discuss their problem solving knowledge and skills in their local schools?*
>
> *Do RUPS trainees use their problem solving knowledge and skills in their local schools?*

The mean frequencies and standard deviations of reported activities with students are presented in Table 14, and those with faculty and colleagues are presented in Table 15.

The results indicate that *RUPS* particpants reported engaging in a mean frequency of 18.13 *RUPS*-like problem solving activities per week with their students. The mean frequency of activities per week with faculty and colleagues was only slightly higher ($\bar{X}$ = 19.36), suggesting that *RUPS* participants perceived that they used *RUPS*-like skills about as often with their peers as with their students. This evidence indicates that the participants in the *RUPS* workshop do use problem solving skills in their work in the classrooms and with faculty and colleagues. However, since there were no comparative data that can be used to interpret these results either from other training groups or from the *RUPS* participants prior to training, it cannot be determined whether these results reflect changes in problem solving behavior that are due to training, or represent typical teacher performance.

It is interesting to observe the trend that is apparent in the weekly average frequency of activities. The period during which *RUPS* skills were most frequently reported used occurred in weeks 4, 5 and 6. This pattern, however, may be an artifact of followup sessions and the possible reactive nature of the data collection procedures. The first

Table 14

Weekly Log--Focus of Activity: Students

Activity	Week 1		Week 2		Week 3		Week 4		Week 5		Week 6		Week 7		Week 8		Week 9		$\Sigma\bar{X}$
	$\bar{X}$	SD	$\bar{X}$	SD	$\bar{X}$	SD	$\bar{X}$	SD	$\bar{X}$	SD	$\bar{X}$	SD	$\bar{X}$	SD	$\bar{X}$	SD	$\bar{X}$	SD	
Tried to made an actual statement of what a particular problem was.	1.18	2.32	1.68	2.00	2.44	6.17	4.35	11.30	3.65	11.47	3.32	9.94	1.44	2.76	1.79	4.27	1.53	3.82	21.38
Tried to identify potential difficulties and aids concerning a particular problem.	.85	2.18	.97	2.41	1.23	2.35	.85	2.47	1.38	4.14	1.50	5.70	.32	1.01	1.35	2.85	.79	2.06	9.24
Made or got some tests or questionnaires to collect data about a problem.	1.32	2.50	2.09	3.74	2.89	6.20	4.59	11.24	4.03	1.42	3.32	9.93	1.47	2.72	2.00	4.29	1.85	3.85	23.56
Collected and analyzed data and thought about how the results applied to a particular problem.	.58	1.41	.62	1.01	1.53	3.95	.85	2.50	1.47	4.16	1.41	5.67	.32	.91	1.29	2.77	.85	2.18	8.92
Thought of or listed different solutions and plans of action to solve a problem.	.74	2.23	1.29	4.50	.97	1.38	1.29	5.64	1.12	3.79	1.50	5.66	.59	1.96	.62	2.01	.97	3.97	9.09
Tried out possible solutions and plans of action to solve a problem.	.18	.63	.50	1.74	.23	.74	.44	1.99	.47	1.16	.76	2.62	.23	1.05	.35	1.39	.56	2.00	3.72
Evaluated or revised solution plans for solving a problem.	.68	2.07	.47	.75	1.56	3.64	2.10	6.66	1.53	4.11	2.38	9.51	1.00	2.64	.65	2.13	.50	1.93	10.87
Discussed general problem solving strategies.	.35	1.15	.41	.89	.41	1.13	.65	2.09	.18	.39	1.00	3.81	.21	.77	.68	2.06	.29	1.09	4.18
Discussed specific problem solving procedures.	1.00	2.16	1.38	1.97	3.00	9.00	4.12	10.56	2.71	4.54	3.76	10.01	1.44	2.71	1.59	3.95	1.76	3.85	20.76
Suggested general problem solving strategies.	.47	1.05	.53	1.05	1.35	3.73	1.03	2.58	.62	1.30	1.06	3.80	.41	1.26	.79	2.11	.79	2.17	6.75
Recommended specific problem solving procedures.	.85	2.12	1.47	2.43	2.77	9.01	2.29	9.92	3.29	11.26	3.50	9.89	1.39	2.67	1.32	3.89	1.56	3.79	18.44
Attended to problem of feedback and interpersonal communications.	.32	1.15	.59	1.84	1.32	3.80	.76	2.41	1.06	3.88	1.03	3.86	.29	.97	.73	2.12	.82	2.21	6.92
Attended to problems of teamwork and group interactions.	.77	2.15	1.18	2.22	1.06	2.26	1.82	4.15	2.94	9.27	2.71	6.88	.71	1.99	1.18	3.98	1.41	3.77	13.78
Thought about or engaged in specific problem solving activities.	.38	1.39	.21	.54	.91	2.22	.38	1.10	.82	2.38	1.03	4.09	.18	.52	.68	2.17	.71	2.01	5.30
$\Sigma\bar{X}$	9.67		13.39		21.67		25.52		25.27		28.28		10.00		15.02		14.39		

Table 15

Weekly Log--Focus of Activity: Faculty and Colleagues

Activity	Week 1		Week 2		Week 3		Week 4		Week 5		Week 6		Week 7		Week 8		Week 9		$\Sigma\bar{X}$
	$\bar{X}$	SD	$\bar{X}$	SD	$\bar{X}$	SD	$\bar{X}$	SD	$\bar{X}$	SD	$\bar{X}$	SD	$\bar{X}$	SD	$\bar{X}$	SD	$\bar{X}$	SD	
Tried to make an actual statement of what a particular problem was.	.94	2.57	.88	1.30	.91	1.54	3.41	10.22	3.26	11.42	3.15	9.63	1.23	2.77	.76	2.13	1.12	2.24	15.66
Tried to identify potential difficulties and aids concerning a particular problem.	.41	.99	.65	1.07	.71	1.29	1.40	3.41	1.41	4.08	1.59	5.77	.50	1.13	1.21	2.76	.68	1.90	8.56
Made or got some tests or questionnaires to collect data about a problem.	.71	2.13	.65	1.28	.82	1.40	2.21	9.38	1.82	7.35	2.56	9.54	1.29	3.06	.73	2.27	.76	2.03	11.55
Collected and analyzed data and thought about how the results applied to a particular problem.	.41	.96	.76	1.16	.68	1.65	1.44	4.66	.97	2.17	1.26	4.14	.56	1.58	1.18	2.86	.76	2.15	8.02
Thought of or listed different solutions and plans of action to solve a problem.	.79	1.99	.65	1.12	.82	1.80	2.50	8.50	2.85	11.29	2.47	9.48	1.12	2.76	.94	3.98	1.21	3.80	13.35
Tried out possible solutions and plans of action to solve a problem.	.38	1.05	.29	.63	.62	1.41	.73	2.33	1.29	4.13	1.06	4.01	.41	.89	1.21	2.75	.73	2.03	6.72
Evaluated or revised solution plans for solving a problem.	.62	2.00	.56	.96	.59	1.08	2.50	8.52	.59	.86	2.47	9.44	1.03	3.13	.91	3.96	.73	2.18	10.00
Discussed general problem solving strategies.	.41	1.02	.23	.55	.62	1.81	.73	2.31	.44	1.46	1.32	5.73	.59	2.10	.71	2.10	.38	.82	5.43
Discussed specific problem solving procedures.	.41	2.66	2.09	3.63	2.62	6.50	3.00	6.00	3.53	7.05	3.35	9.98	1.65	3.12	1.82	4.42	1.59	2.63	20.06
Suggested general problem solving strategies.	.59	1.35	1.29	2.70	2.21	4.46	1.80	4.50	1.71	3.92	1.68	5.79	.91	2.35	1.38	2.70	1.18	2.37	12.75
Recommended specific problem solving procedures.	1.00	2.39	1.23	1.61	2.80	5.94	3.56	9.95	2.76	6.33	3.73	10.25	1.35	2.94	1.65	4.13	1.26	2.48	19.34
Attended to problem of feedback and interpersonal communications.	.50	1.46	.76	1.65	1.68	3.04	1.56	3.31	1.56	3.69	2.18	6.27	.50	1.08	1.15	2.43	1.21	2.40	11.10
Attended to problems of teamwork and group interactions.	1.27	2.86	1.59	2.28	2.12	3.07	2.85	9.38	3.50	8.26	4.06	10.35	1.00	2.72	1.56	4.34	1.85	4.35	19.80
Thought about or engaged in specific problem solving activities.	.77	2.44	1.06	2.27	1.06	2.52	1.59	3.43	1.68	4.41	2.26	6.70	.65	1.86	1.44	3.08	1.38	3.25	11.89
$\Sigma\bar{X}$	9.21		12.69		18.26		29.28		27.37		33.14		12.79		16.65		14.84		

followup session occurred during the sixth week. At the end of the third week participants from whom the Weekly Log for the preceding week(s) had not been received were telephoned. In each case the intervention, either in the form of a phone call or the followup session, may have had the effect of increasing the self-reported frequency of activities. It is not possible to determine whether this effect was the result of increased participant awareness of problem solving activities, or the exaggerating of frequencies in response to social pressure.

It is also interesting to note the obvious differences in the ordering of the mean total frequency for each activity over the nine-week period that are dependent on the focus of the activities. This suggests that different sets of skills are used in relation to different audiences. The three activities reported most frequently used in relation to students are: (a) made or got some tests or questionnaires to collect data about a problem, (b) tried to make an actual statement about what a particular problem was, and (c) discussed particular problem solving procedures. On the other hand, the three activities most frequently used in relation to faculty and colleagues are: (a) discussed specific problem solving procedures, (b) attended to problem of teamwork and group interaction, and (c) recommended specific problem solving procedures. There appears to be a tendency to use and discuss skills that are diagnostically and analytically oriented in relation to work with students, while *RUPS* skills most frequently used in relation to work with faculty and peers are those that are more oriented to the generation of solutions.

Impact on Secondary Groups. The following question was answered by data gathered from the two administrations of the School Activities Questionnaire (SAQ) to the students of the *RUPS* trainees.

Does RUPS training result in changes in classroom climate?

This data tested the hypothesis that *RUPS* training has long-term effects on the learning environment. The data and statistical analysis are reported in Table 16. These analyses were conducted only from those *RUPS* trainees having complete data.

Table 16

Correlated t-Values
SAQ--*RUPS* Treatment Group

Variable	Pre X	Pre SD	Post X	Post SD	Difference X	Difference SD	t-Value	df	p-Value
Reinforcement of Self-Concept	12.00	.61	11.75	.71	-.25	.67	-2.04	28	.05
Classroom Participation	10.49	.98	10.32	.83	-.17	.47	-1.88	28	.07
Individualization of Instruction	11.46	.67	11.44	.59	.03	.64	.21	28	.84
Democratic Classroom Control	14.19	1.30	14.39	1.20	.20	.82	1.31	28	.20

The results of the correlated t-tests indicated that the only significant change in any of the subscale measures over a three-month period was for the reinforcement of self-concept scale with the direction of the change being negative. Based on these results, there is no evidence that, as measured by the SAQ, *RUPS* training had any positive long-term effects on learning environment.

Do RUPS trainees involve their students in problem solving activities more than do teachers who have not received RUPS training?

It was hypothesized that since *RUPS* is a workshop in problem solving that is heavily oriented to use in classrooms, participation in *RUPS* training would lead to a change in problem solving behaviors

affecting the learning environment and that these changes could be detected in student ratings of classroom climate as measured by the SAQ.

The analysis technique used to test these hypotheses was path analysis. The path diagram reflecting these hypotheses is an extension of the path diagram presented in Figure 2 and is presented in Figure 3.

Variables were selected for this path analysis on the basis of their match with the overall conceptual model presented in Figure 1 and the reliabilities of the measures used. As stated earlier it was assumed that age, sex, class size and *RUPS* training (a dummy variable where *RUPS* = 1 and control = 0) were all reliably measured. The task accomplishment scale was chosen as the measure of teacher attitude because of its relatively superior reliability compared to the other PSOQ scales (see Table 2). Level of classroom participation, individualization of instruction, and democratic classroom control were chosen as the final dependent variable because their posttest reliabilities were all significant beyond the .01 level.

The recursive regression equations corresponding to this path diagram are as follows:

$$Z_5 = P_{5,1}Z_1 + P_{5,2}Z_2 + P_{5,3}Z_3 + P_{5,4}Z_4 + P_{5,a}Z_a$$

$$Z_6 = P_{6,1}Z_1 + P_{6,2}Z_2 + P_{6,3}Z_3 + P_{6,4}Z_4 + P_{6,5}Z_5 + P_{6,b}Z_b$$

Table 17 includes the multiple correlation and the path coefficients indicating the presence of a direct relationship between each of the exogenous variables and the level of classroom participation. While the multiple correlation is not significant, the path coefficients (standardized partial regression coefficients) indicate that the data conformed to the hypothesis that teacher attitude toward problem solving influenced classroom climate as perceived by students. However, there

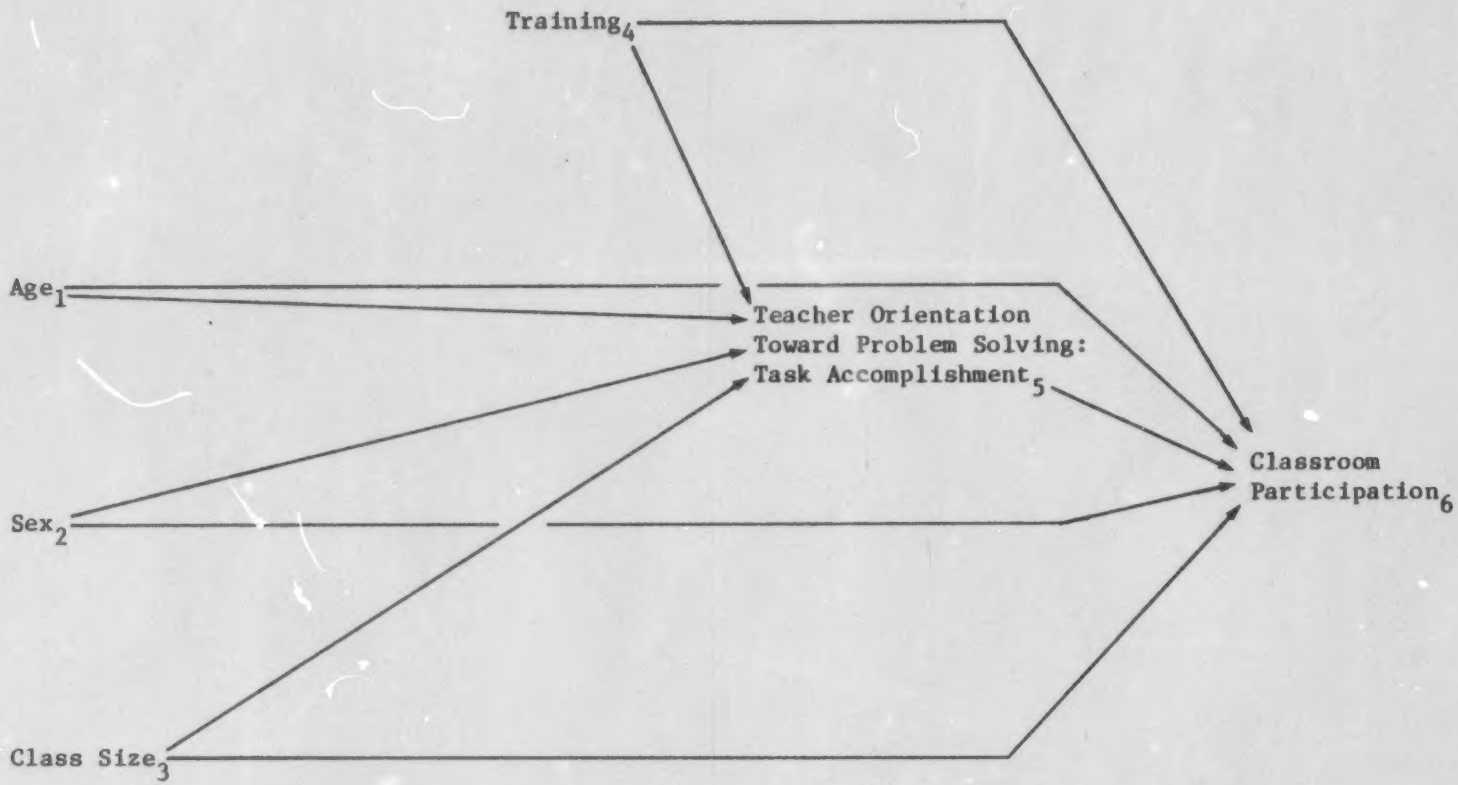

Figure 3. Path diagram for the evaluation of teacher training in terms of its impact on the level of classroom participation.

was no evidence that training had any impact on classroom climate as measured by the level of classroom participation.

Table 17

Multiple Correlation and Standardized Partial Regression Coefficients for Explaining Posttraining Level of Classroom Participation[a]

Exogenous Variable	Multiple Correlation	Standardized Partial Regression Coefficient	p-Value
Age	.46	.21	.32
Sex		.29	.13
Class Size		-.21	.25
Training		.11	.54
Posttraining Teacher Orientation Toward Problem Solving: Task Accomplishment		.46	.02

[a]Only subjects for whom there were complete data were used in this analysis. (Classroom: N=26, *RUPS*; N=10, Control; N=36, Total) (Student: N=650, *RUPS*; N=281, Control; N=931, Total)

Tables 18 and 19 present replications of the path analysis using individualization of instruction and democratic classroom control as the final dependent variables in the place of classroom participation. Essentially similar results were found. The major difference being that the multiple correlation obtained in Table 19 was significant ($p \leq .03$) indicating a better fit when democratic classroom control was used as a final dependent variable. While training had no effect upon either individualization of instruction or democratic classroom control, these data were again consistent with the hypothesis that teacher orientation toward problem solving influenced student perceptions of classroom climate.

Table 18

Multiple Correlation and Standardized Partial Regression Coefficients for Explaining Posttraining Level of Individualization of Instruction[a]

Exogenous Variable	Multiple Correlation	Standardized Partial Regression Coefficient	p-Value
Age	.44	.24	.25
Sex		.17	.35
Class Size		-.10	.58
Training		-.19	.31
Posttraining Teacher Orientation Toward Problem Solving: Task Accomplishment		.38	.05

[a]NOTE: Classroom: N=26, *RUPS*; N=10, Control; N=36, Total
Student: N=650, *RUPS*; N=281, Control; N=931, Total

Table 19

Multiple Correlation and Standardized Partial Regression Coefficients for Explaining Posttraining Level of Democratic Classroom Control[a]

Exogenous Variable	Multiple Correlation	Standardized Partial Regression Coefficient	p-Value
Age	.57	.24	.21
Sex		.22	.20
Class Size		.20	.24
Training		-.02	.93
Posttraining Teacher Orientation Toward Problem Solving: Task Accomplishment		.49	.01

[a]NOTE: Classroom: N=26, *RUPS*; N=10, Control; N=36, Total
Student: N=650, *RUPS*; N=281, Control; N=931, Total

CHAPTER FOUR: CONCLUSIONS

A summary of the findings from this study will be presented in this chapter. The conclusions will concern: (a) participant attitudes toward the *RUPS* instruction system, (b) trainee performance, and (c) the impact of *RUPS* training on secondary audiences.

Participant Attitudes Toward the *RUPS* Instructional System

The majority of the participants responded positively to all questions that related to the workshop's success in meeting its goals and objectives, presenting relevant materials and concepts, meeting personal expectations, providing practical information, teaching useful skills, and helping participants understand the role and possibilities of problem solving in schools. These positive opinions were generally maintained over a 3-month period. However, participants became less positive about the workshop's success in offering new insights and ways of viewing old problems, fewer people responded positively concerning the use and applicability of *RUPS* to work with students, and fewer people summed up their workshop experience positively. The enthusiastic attitudes of the participants immediately following the workshop as reflected by their responses to the questionnaire were confirmed by the observations of the evaluators who noted that the activities and interpersonal interactions in the workshop appeared to generate considerable enthusiasm on the part of the participants.

These results indicate that persons who participate in *RUPS* workshops generally develop positive, if not enthusiastic, attitudes about all aspects of the instructional system. This is most likely due to the important role played by personal and group dynamics in the

RUPS training, since both participants and observers attributed positive participant attitudes to the group exercises. Furthermore, these positive attitudes appear to remain stable over a three-month period. The few negative changes that occurred may be most likely attributed to adjustments caused by feedback from attempts to use the techniques taught by *RUPS*. They most probably reflect a more realistic understanding of the applicability of *RUPS* in the school environment, in contrast to the general enthusiasm generated by the workshop. However, the fact that most attitudes remained positive appears to indicate that the participants did not receive excessive negative feedback in their attempts to employ *RUPS* techniques.

Trainee Attitude

There was a significant increase in the *RUPS* trainees' orientation toward task related problem solving and classroom related problem solving. The *RUPS* group was compared to a nontreatment control group by means of path analysis. Training did not appear to have any effect upon teacher attitude as measured by the task accomplishment scale of the PSOQ.

The responses of the participants to the questions concerning their working understandings of the materials did not change over three months. At the conclusion of the workshop and again after three months, participants rated their working understanding of *RUPS* highly, indicating a high degree of confidence in their abilities to understand and perform the skills and concepts learned in training. There is, however, no other evidence of the understanding and performance of problem solving activities of the *RUPS* participants that would support these self-reports. The SAQs that were administered to the classes of the *RUPS* participants which would have provided supporting evidence did not produce significantly

positive changes on any of the subscales. Although there is no evidence available as to the actual performance change, these results do provide evidence concerning the confidence and assurance of the participants in their ability to implement the *RUPS* process. It is likely that this self-report is more an index of attitude and participant satisfaction rather than an index of performance or performance change.

The evidence in this section tends to support the conclusion of the previous section: *RUPS* is successful in promoting positive attitudes toward training in its trainees. The positive attitudes are reflected in the high degree of confidence and assurance the participants express having in their working understanding of the materials.

Trainee Behavior

The results from Forms 1 and 2 of the Weekly Log indicated that after training *RUPS* participants tended to identify fairly complex problems for their improvement projects that are pursued for at least a month, and that they perceive themselves engaging in *RUPS*-like problem solving activities with students and with faculty and colleagues. As no comparative data are available on the Weekly Log, either from other groups or from the *RUPS* participants prior to the workshop, it is not possible to determine whether these reported behaviors reflect changes in trainee performance, or if they do, that these changes are attributable to *RUPS* training.

In addition, it is likely that the responses of the trainees reflect a heightened awareness of and sensitivity to their problem solving behaviors due to the reactive effects of the instruments. This is supported by the trend in the number of activities reported weekly on Form 1, where the number peaked in the middle of the reported period

and fell off toward the end. This most likely indicates that the participants were initially sensitized by the instruments, but that the effect wore off with repeated applications. Thus, it would appear that the conclusion that can be drawn from these data is that the self-reports of the participants probably reflect an increased awareness of, and sensitivity to, problem solving and problem solving behaviors possibly due to the instruments, but the Weekly Log does not provide evidence as to the existence of any changes in performance due to *RUPS* training.

Participant Behavioral Changes with Impact on Secondary Audiences

The secondary audiences that are being considered in this study are the students and peers (faculty and colleagues) of the *RUPS* trainees. The behavioral changes and the nature of the impact were assessed through Form 1 of the Weekly Log and the SAQ.

RUPS trainees report engaging in *RUPS*-like problem solving activities with both their students and peers. The frequency of these activities, however, may be somewhat inflated due to the reactive effects of the instruments as discussed previously. The findings indicate that *RUPS* trainees perceive themselves as using problem solving skills, but that the type of skills used differs in relation to the specific audience that is being addressed. However, since there are no preworkshop data or comparison groups that used the Weekly Log, it is not possible to determine if changes in this type of behavior were cuased by participation in the *RUPS* workshop.

Concerning impact of this behavior, it was assumed that the self-reports of *RUPS* trainees of their use of problem solving processes and skills are indicative of a change in problem solving behaviors. It was hypothesized that these changes would in turn effect a change in the

learning environment as measured by the four subscales of the SAQ. However, student ratings on the SAQ did not change significantly over time for the *RUPS* group from pretest to posttest except for one negative change. Low reliabilities precluded definitive conclusions concerning the effectiveness of *RUPS* training in modifying classroom climate as measured by four subscales. In an attempt to focus the analysis on variables that possessed adequate reliability one classroom climate measure, classroom participation, was used in a path analysis designed to reflect the complex hypothesis that *RUPS* training affects classroom climate through its impact upon the orientation of teachers toward using the problem solving procedures advocated in *RUPS*. The analyses did not support the hypothesis dealing with training effects on either the teacher attitude measure or the level of classroom participation as seen by students. However, some support was given to the hypothesis that teacher orientation toward problem solving was related to students' perception of the level of classroom participation. When this analysis was repeated for two additional climate scales, individualization of instruction and democratic classroom control, essentially similar results were obtained.

Based on the data collected in this study, there is no evidence of behavioral changes that impact on secondary audiences and that may be attributed to *RUPS* training. Although the participants perceive themselves as using and discussing their problem solving skills with students and peers and express a high degree of satisfaction with the training, there is no evidence that would support the conclusions that either their behavior is different from their behavior prior to the training, or if their behavior is indeed different, it has any

measurable impact on the secondary audiences in terms of the aspects of classroom climate measured in this study. There was some evidence that orienting behaviors of trainees as measured by the PSOQ task accomplishment scale did relate to the classroom learning environment.

Summary

The results of this study indicate that *RUPS* was effective in developing positive attitudes toward problem solving training. The study did not supply evidence from which either long- or short-term performance changes can be inferred. The results do not necessarily indicate that *RUPS* training was not effective in promoting change. It is possible that a variety of shortcomings and limitations of the evaluation design did not allow for the identification and measurement of these changes. In the same sense, the lack of evidence as to the impact of *RUPS* training on secondary audiences does not necessarily indicate that *RUPS* had no impact. This finding may be due to the particular approach taken to this evaluation. Results do suggest, however, that teacher attitude toward the application of problem solving techniques in dealing with classroom tasks may be a viable route to modifying classroom climate.

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Appendix A:

STAGES OF EVALUATION AND PRODUCT DEVELOPMENT OF THE IMPROVING TEACHING COMPETENCIES PROGRAM

The management plan for the Improving Teaching Competencies Program (see *Resource Allocation and Management Plan*, 1974) divides the work flow for the development of an instructional system into five phases: Planning, Pilot, Interim, Field Test and Outcome. Each phase consists of certain development, evaluation and field relations activities that culminate in a milestone report.

The range of activities associated with developing an instructional system is summarized in Diagram I, pages 81-90. These activities are divided into five major categories: needs, objectives, product development, testing and implementation. Diagram I also partitions these activities among seven functional areas including management, development, field relations, dissemination, formative evaluation, internal summative evaluation and external summative evaluation. The matrix is not necessarily prescriptive nor are the evaluation relationships among each part strictly linear.

The specific activities engaged in during the development of an instructional system differ according to the phase under consideration, the unique needs of the specific product or change support process being developed and, occasionally, the style preferences among work unit teams. For more specific and detailed statements, reference should be made to the development and evaluation plans and documents for each work unit.

Evaluation differs according to each phase of the development. During the initial phases, evaluation focuses on formative issues and provides information primarily for system developers. During the latter phases, the emphasis is on summative evaluation which provides information and judgments for potential users of the system. This shift in emphasis is illustrated in Figure A.

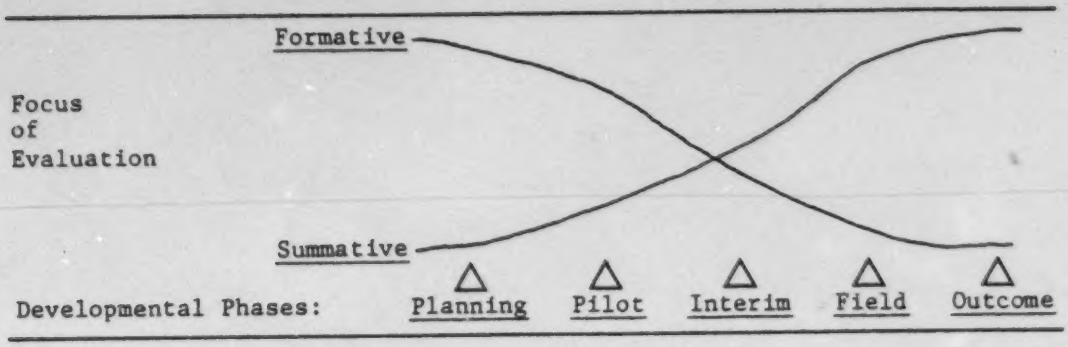

Figure A. Evaluation Emphasis in the Developmental Phases.

The following paragraphs describe in general terms the ways development and evaluation activities are organized for each phase of product development.

Planning Phase. In this phase, several key activities provide the focus for effort. The initial conception of the proposed instructional system is described along with its intended objectives. A need for the proposed system is documented, and evidence provided that adequate conceptualizations and instructional strategies exist or can be developed feasibly for the proposed training package. Initial development, evaluation and dissemination plans are produced, as are timelines, staffing needs and budgets.

Pilot Phase. In this phase, a prototype of the instructional system is developed and tried out on a small group of users from the target group. Objectives of the system and entry conditions for participants are clarified. Program evaluators provide formative evaluation information to assist developers with revisions. The information includes observer and trainer assessments of participant involvement in the activities, measurements of participant satisfaction with the content, strategies and utility of the system. The workability of the activities,

the logic of the content and the quality of the teaching aids and materials are also assessed at this phase by the user groups. Description and preliminary assessment of trainee outcomes are initiated.

The collection of information regarding the marketability and costs of the instructional system commences during the pilot phase as does the documentation of the developers' claims regarding the intents of the system in comparison to existing alternatives.

Interim Phase. During this phase, the instructional system goes through one or more cycles of revision and a nearly finished product is completed. By the end of this phase, the appropriateness of objectives has been determined, statements of objectives finalized and instrumentation to measure these selected or developed. For instructional systems requiring a workshop format, specifications are determined for desirable workshop conditions and qualifications for effective trainers.

The major focus of the evaluation activities for this phase is on confirmation of the system's ability to produce specified short-term outcomes and to test the workshop conditions, trainer qualifications and dissemination feasibility. This may be accomplished partially through conducting a "criterion workshop" designed to resemble closely the field conditions. The basic decision served by evaluation is whether the instructional system is ready for internal summative evaluation and adequate for comprehensive field and outcome testing.

Field Test Phase. In this phase, minor revisions are made on the instructional system and a product close to finished form is expected to exist. Also, in this phase, an internal summative evaluation will focus on assessment of short-term outcomes of the instructional system. Specifically, this means finding answers to questions regarding knowledge,

awareness and attitudinal growth, and participant performance change that can be expected as a result of active participation in the system's training design under field conditions with typical trainees, trainers and workshop settings. Variables related to problems of installation and dissemination may also be examined at this point.

Outcome Phase. During this phase, which may occur simultaneously with the previous phase, the instructional system is finished and internal summative evaluation will assess the system's ability to produce, not only specified short-term outcomes in terms of participant satisfaction, knowledge, awareness or attitudinal gain and performance change, but also transfer, retention and impact upon secondary audiences such as students and/or peers. At this point evaluation plans are made for external summative evaluation studies such as critical comparisons between the outcomes of the instructional system being evaluated and outcomes produced by other relevant treatment efforts. External summative validations of the product are also completed in this stage.

Diagram I

PRODUCT DEVELOPMENT IN IMPROVING TEACHING COMPETENCIES PROGRAM

	Program Management	Development	Field Relations	Dissemination	Formative Evaluation	Internal Summative Evaluation	External Summative Evaluation
MEANS Theoretical/Value Empirical Field Desire/Readiness Expert Review	Approves a documented need statement as: 1. Compatible with Program and value position 2. A feasible priority for the Program to undertake. Approves the feasibility and appropriateness of approaches to data gathering determined necessary from field of potential users and from experts, except for external summative assessment of needs. Approve any iterations of needs statement.	Generates rationale statement including theoretical content and strategies, value and social problem. Collaborates with evaluators on product review, literature review and justification. Initiates reassessment of need when appropriate.	Arranges for data collection from the field. This would include following procedures for identifying sample populations, arranging for data collection from identified samples and collecting the data as well as delivering the data for processing, analysis and interpretation. Works with formative evaluators on a needs assessment to determine field demands for development of product.	Initiates needs assessment with regard to dissemination activities. Determines dissemination performance requirements and constraints. Performs mission analysis, functional analysis, task analysis and method/means analysis for dissemination of product.	Develops procedures for and collects information concerning the need. This should include such factors as an indication of the number of people affected, the social significance of the need, the absence of substitutes, the urgency of the matter, the possibility of multiplicity affects. Need statements may be derived from such sources as the learner, the society or the subject matter.	Arranges for any external summative evaluation of the need statement.	Evaluates the adequacy of the need statement.

Column Headings should be read as functions (not roles or person). Headings in Column 1 denote five major classes of activities. No particular sequence or temporal relationship is necessarily implied. Entries should not be read as prescriptive for any particular work unit. Again, no particular sequence or temporal relationship is necessarily implied.

Diagram I

PRODUCT DEVELOPMENT IN IMPROVING TEACHING COMPETENCIES PROGRAM

	Program Management	Development	Field Relations	Dissemination	Formative Evaluation	Internal Summative Evaluation	External Summative Evaluation
OBJECTIVES Purpose Behavioral Outcome Objectives Behavioral Instrumental Objectives	Approves statements of instructional system's purpose and behavioral objectives at each stage during planning, product development and evaluation as iterated. These statements are considered in relation to their appropriateness to Program purpose, values and feasibility within Program resources. Approves appropriateness of expert reviewers and review procedures, except for external summative reviews.	Generates general goals and refines objectives of instructional system; to be completed by iterative process. Collaborates and concurs with evaluation to operationalize and classify objectives. Revises statements of objectives when appropriate on the basis of testing and inputs from field relations and formative and summative evaluation.	Reviews product objectives. Provides feedback to developers and evaluators concerning potential target groups for whom the objectives are relevant.	Generates dissemination objectives in collaboration with developers and evaluators.	Initiates the operationalization of product objectives for measurement purposes. (Determines relevant domains of variables from objectives.) Classifies objectives into categories as appropriate. One possible categorization scheme might be: 1. Instructional objectives (trainee behavior) 2. Instrumental objectives (trainee behavior) 3. Outcome objectives or indicators (trainee objectives) 4. Impact objectives or indicators (evidence that changes in trainee behavior made any differences in a secondary target group) 5. Implementation objectives (trainer behavior) Other factors to be considered are the prerequisite competencies or experiences of the learner and social and psychological characteristics of the learner. Arranges for external review of objectives. Provides feedback to developers.	Arranges for any external summative evaluation of the objectives. Provides feedback to formative evaluators concerning the degree to which the statements of objectives serve to delimit the selection or development of instrumentation (technique items, scoring keys, empirical base for constructs implied).	Evaluates the objectives.

Column headings should be read as functions (not roles or person). Headings in Column 1 denote the major classes of activities. No particular sequence or temporal relationship is necessarily implied. Entries should not be read as prescriptive for any particular work unit. Again, no particular sequence or temporal relationship is necessarily implied.

Diagram I

PRODUCT DEVELOPMENT IN IMPROVING TEACHING COMPETENCIES PROGRAM

	Program Management	Development	Field Relations	Dissemination	Formative Evaluation	Internal Summative Evaluation	External Summative Evaluation
PRODUCT Design Specifications Content Instructional Design Materials Expert Review Instructional System Reports	Approves design specifications as appropriate to Program purpose, values and feasibility including those which are prespecified and those which are emergent. Approves selection and iterations of content, instructional design and materials as consistent with design specifications and evaluations at each stage of development. Approves appropriateness of expert reviewers and expert review procedures except for external summative assessment. Approves reports of planning and progress on creation and iterations of the instructional system.	Responsible for generation and revision, as a result of testing, of content, materials, instructional processes, participant processes, workshop climate specifications, participant prerequisites, workshop specifications and trainer qualifications. Oversees editing needs in collaboration with editor. Contributes to identification and review of potentially competitive systems.	Initiates and arranges for marketing surveys to ascertain the likely reachable market.	Generates the strategy for dissemination. This would include identifying the role of the regional network, publishers, training cadres, colleges and universities, state departments of education and school districts. Determines promotional material for different audiences and potential distribution. Projects potential target audiences.	Provides for feedback concerning the degree to which content fits specifications or if content specifications are not made explicit, then formative evaluation provides for feedback on the apparent content domain (may require expert review). The same function as described above for content specifications is appropriate for materials specifications and strategies specifications. Formative evaluation obtains and feeds back cost information partitioned into the following categories: 1. Development only costs 2. Product costs 3. Delivery costs exclusive of product costs 4. Maintenance costs Arranges for external review of product in regard to goals, content, strategies, disseminability and cost/benefit potentials for developers.	Arranges for any external summative evaluation of content, materials and strategies.	Evaluates the content, materials and strategies.

Column headings should be read as functions (not roles or person). Headings in Column 1 denote five major classes of activities. No particular sequence or temporal relationship is necessarily implied. Entries should not be read as prescriptive for any particular work unit. Again, no particular sequence or temporal relationship is necessarily implied.

Diagram I

PRODUCT DEVELOPMENT IN IMPROVING TEACHING COMPETENCIES PROGRAM

	Program Management	Development	Field Relations	Dissemination	Formative Evaluation	Internal Summative Evaluation	External Summative Evaluation
TESTING Evaluation Designs Instrumentation Criteria Short-Term Effects Long-Term Effects Critical Comparisons Expert Review Test Reports	Approves appropriateness and feasibility of evaluation designs and instrumentation criteria for short- and long-term effects throughout formative evaluation. Critiques the appropriateness and adequacy of evaluation designs and instrumentation criteria for internal summative evaluation and advises on feasibility. Approves Program claims for use in critical comparisons. Provides recommendations of possible comparisons. Approves reviewers selected for substantive appropriateness except for external summative evaluation. Approves appropriateness of review procedures. Approved adequacy and validity of formative test reports and critiques appropriateness of internal summative test reports. Determines that arrangements are completed for the necessary forms, clearance procedures and protection of human subjects procedures.	Provides evaluators with formative evaluation needs. Provides inputs to summative evaluation. Participates and observes in field trial during early stages of development; later stages, observes. Helps develop instrumentation criteria for evaluative system including trainee outcomes, secondary outcomes, costs installation and critical competitors. Concurs with evaluators on formative evaluation designs. Inputs and critiques internal summative designs.	Reviews evaluation design. Provides feedback concerning feasibility of design. Identifies subjects and arranges appropriate site conditions for testing products during all stages of development. Provides competent installers and trainers for formative and internal summative evaluation. Identifies potential sites for external summative evaluation. Identifies pool of competent trainers and qualified participants, when appropriate, for external summative evaluation.	Disseminates results of testing to various appropriate audiences.	Selects and/or develops instrumentation for formative use. This would include instrumentation for capturing responses made during the process of instruction and responses made to end of workshop criterion tests or measures. Develops designs and instrumentation to assess immediate workshop effects. Possible areas in which effects may be examined include: 1. Trainee knowledge 2. Trainee attitudes a. About self b. About other people or things 3. Trainee behavior (skills, etc.) Develops designs and instrumentation to assess long-term effects when this information is needed by development staff to assist product development. Conducts the designed studies. Provides inputs to the file on critical competitors.	Reviews and approves formative instrumentation for summative use. Selects or develops instrumentation for summative study. Instrumentation would be developed for the following: 1. Workshop outcomes 2. Long-range trainee effects 3. Impact 4. Other variables which can be identified as important control variables or have been demonstrated to interact with the treatment to affect outcomes Initiates and collaborates with formative evaluator to design instrument development and validation procedures to be used for both formative and summative work. Designs and conducts summative studies for assessing workshop effects under field conditions. Develops designs and instrumentation to assess long-term effects. Collaborates with formative evaluators when early interaction is needed. Designs would include provision for assessing retention, transfer and application. Conducts the designed studies. Arranges for the external summative evaluation with respect to possible critical competitors. Maintains a file on critical competitors identified by NWREL.	Evaluates instrumentation. Replicates evaluation studies conducted to assess immediate workshop effects. Replicates the evaluation studies conducted to assess long-range effects. Identifies any additional critical competitors which may have been recently generated or had been overlooked by the Program. Makes judgments on the relative merits of the product and the various critical competitors.

Column headings should be read as functions (not roles or person). Headings in Column 1 denote five major classes of activites. No particular sequence or temporal relationship is necessarily implied. Entries should not be read as prescriptive for any particular work unit. Again, no particular sequence or temporal relationship is necessarily implied.

Diagram I

PRODUCT DEVELOPMENT IN IMPROVING TEACHING COMPETENCIES PROGRAM

	Program Management	Development	Field Relations	Dissemination	Formative Evaluation	Internal Summative Evaluation	External Summative Evaluation
IMPLEMENTATION Conditions for Use Installation Steps Alternative Diffusion/ Dissemination Strategies Product Reports/Sales Literature	Approves procedures and materials for implementing use of instructional system as congruent with Program purpose and values, evaluation data, and logical conceptions regarding user conditions and steps for installation. Approves Program strategies to support diffusion and dissemination including sales literature as appropriate to purpose and values of the Program and as consistent with perceptions and evaluations gained during development. Approves and recommends product readiness for publication.		Generates dissemination issues. Provides feedback concerning problems and constraints for developers, evaluators and program managers. Arranges for installation sites. Provides trainers when needed. Provides information for evaluators and developers concerning necessary installation procedures. Provides training for installers and trainers for formative and internal summative evaluation tests.	Provides a dissemination plan which includes: 1. Arranging for training of dissemination managers and senior trainers 2. Preparing regional network, cadres, colleges, universities, state departments and school districts to deliver products 3. Providing training for installation managers 4. Developing alternative diffusion/ dissemination strategies 5. Arranging for any market research 6. Collaborating with publishers in identifying different types of dissemination/sales personnel and conducting sales training meetings Works collaboratively with evaluators in evaluating the Program's dissemination strategies.	Works collaboratively with dissemination to develop procedures for and collects information concerning the Program's diffusion/dissemination strategies. Develops procedures for and collects information concerning the marketing and sales of Program's products. Helps identify alternative diffusion/dissemination/ marketing strategies. Arranges for any external review of strategies.	Arranges for any external evaluation of diffusion/dissemination strategy.	Evaluates the diffusion/dissemination strategy.

Column headings should be read as functions (not roles or person). Headings in Column 1 denote five major classes of activities. No particular sequence or temporal relationship is necessarily implied. Entries should not be read as prescriptive for any particular work unit. Again, no particular sequence or temporal relationship is necessarily implied.

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Appendix B:

INSTRUMENTS USED IN THE
RESEARCH UTILIZING PROBLEM SOLVING
EVALUATION STUDY

Name _____
System _____
Trainer _____
Site _____
Date _____ Sex ____ Age ____

1. HOME MAILING ADDRESS: Street _____ Phone _____
City _____ State _____ Zip _____

2. WORK ADDRESS: Street _____ Phone _____
City _____ State _____ Zip _____

3. POSITION: (Check one) ___ Primary (1-3) ___ Elementary (4-6)
___ Jr. High (7-9) ___ Senior High (10-12)

4. YEARS TEACHING EXPERIENCE: (Check appropriate space below)

___ 0 ___ 1-3 ___ 4-6 ___ 7-10 ___ 11 or more

5. HIGHEST DEGREE OBTAINED: ___ BA ___ MA ___ Doctorate

6. CHECK THE APPROPRIATE SPACES IF YOU HAVE BEEN INVOLVED IN OTHER NWREL INSTRUCTIONAL SYTEMS:

___ Interaction Analysis
___ Facilitating Inquiry
___ Higher Level Thinking
___ SAFE
___ Conflict-Negotiations
___ Interpersonal Influence
___ Interpersonal Communications
___ Group Process Skills
___ PETC-I
___ PETC-II
___ PETC-III

7. People attend workshops for a variety of reasons. Please check honestly any of the following reasons that apply to you, and circle the checkmark of the reason which is most important in your decision to attend.

___ It satisfies a requirement or gives me credits I need.
___ Many others in my school were attending.
___ My superiors suggested I go.
___ My superiors gave me the opportunity to go.
___ I was selected to attend.
___ My attendance was paid for.
___ I came because I really wanted to learn.
___ I'd heard _____
___ I had a particular problem to solve or deal with and thought this training would help me.
___ Other (what?) _____

PROBLEM SOLVING ORIENTATION QUESTIONNAIRE

This questionnaire is being used to obtain information concerning various orientations towards problem solving. Please answer the following questions as honestly and completely as possible. The Problem Solving Orientation Questionnaire is to evaluate the *RUPS* system, NOT YOU. Information collected will be used only for these evaluation purposes; all responses will be kept completely confidential.

Directions for Completing the Questionnaire

A separate answer sheet has been provided for this test. Please be sure to write your name in the provided space. Mark all of your responses on this sheet. IT IS MOST IMPORTANT THAT YOU USE ONLY A NUMBER 2 PENCIL.

On the scales below you will be asked to make predictions concerning your behavior in a variety of situations. Mark your responses in the way which corresponds to your predictions about your own behavior in the following hypothetical situations. An example of the type of question you might be asked is:

80. Suppose your principal criticizes your treatment of a certain classroom problem and you feel the criticism is unjustified due to circumstances unknown to the principal. What are the chances that you would try to defend your actions by telling the principal of these circumstances?

    1. Almost none (less than a 10 percent chance)
    2. Maybe (about a 25 percent chance)
    3. Possibly (about a 50 percent chance)
    4. Almost always (about a 75 percent chance)
    5. Definitely (greater than a 90 percent chance)

If you think this is how you would behave in such a situation, your answer would be definitely (greater than a 90 percent chance) and your answer sheet would look like this:

If, on the other hand, you are not sure but think this is how you would possibly behave (about a 50 percent chance), your answer sheet would look like this:

When changing an answer be sure your first answer is completely erased before darkening the column of your choice. MAKE SURE THERE ARE NO STRAY MARKS ON YOUR PAPER.

A. 1. Suppose you have a particularly difficult day with your class. What are the chances that you would spend some time listing the specific problems you had encountered?

1. Almost none (less than a 10 percent chance)
2. Maybe (about a 25 percent chance)
3. Possibly (about a 50 percent chance)
4. Almost always (about a 75 percent chance)
5. Definitely (greater than a 90 percent chance)

2. Suppose some other staff member at your school mentiones a problem that you are also experiencing. What are the chances that you would describe your own feelings or reactions to the problem?

1. Almost none (less than a 10 percent chance)
2. Maybe (about a 25 percent chance)
3. Possibly (about a 50 percent chance)
4. Almost always (about a 75 percent chance)
5. Definitely (greater than a 90 percent chance)

3. Suppose some of the students in your class seem to have difficulty mastering a particular skill. What are the chances that you would consider how your own behavior was related to theirs as you analyzed their problem?

1. Almost none (less than a 10 percent chance)
2. Maybe (about a 25 percent chance)
3. Possibly (about a 50 percent chance)
4. Almost always (about a 75 percent chance)
5. Definitely (greater than a 90 percent chance)

4. Suppose you were trying out a new curriculum or project in your classroom. What are the chances that you would regularly keep a written record of problems you encountered?

1. Almost none (less than a 10 percent chance)
2. Maybe (about a 25 percent chance)
3. Possibly (about a 50 percent chance)
4. Almost always (about a 75 percent chance)
5. Definitely (greater than a 90 percent chance)

5. Suppose something has gone wrong in your school--something that affects everyone and has everyone pretty upset. What are the chances that you would remain quiet and wait for others to analyze the problem?

1. Almost none (less than a 10 percent chance)
2. Maybe (about a 25 percent chance)
3. Possibly (about a 75 percent chance)
4. Almost always (about a 75 percent chance)
5. Definitely (greater than a 90 percent chance)

6. Suppose you and the students in your class have identified a problem related to lunch time behavior. What are the chances that you would encourage a class discussion of possible ways to overcome the problem?

    1. Almost none (less than a 10 percent chance)
    2. Maybe (about a 25 percent chance)
    3. Possibly (about a 50 percent chance)
    4. Almost always (about a 75 percent chance)
    5. Definitely (greater than a 90 percent chance)

7. Suppose the staff is discussing a problem related to sharing equipment and materials. What are the chances that you would make a suggestion about a possible new arrangement that could alleviate the probem?

    1. Almost none (less than a 10 percent chance)
    2. Maybe (about a 25 percent chance)
    3. Possibly (about a 50 percent chance)
    4. Almost always (about a 75 percent chance)
    5. Definitely (greater than a 90 percent chance)

8. Suppose you thought that many students in your class were not doing well in a particular area. What are the chances that you would go to them and ask for their suggestions about ways that might improve the situation?

    1. Almost none (less than a 10 percent chance)
    2. Maybe (about a 25 percent chance)
    3. Possibly (about a 50 percent chance)
    4. Almost always (about a 75 percent chance)
    5. Definitely (greater than a 90 percent chance)

9. Suppose you and your class decided to take on a long-term project to help the school or community in some way. What are the chances that you and your class would jointly plan all the steps involved and consider how you would monitor progress as you implemented the project?

    1. Almost none (less than a 10 percent chance)
    2. Maybe (about a 25 percent chance)
    3. Possibly (about a 50 percent chance)
    4. Almost always (about a 75 percent chance)
    5. Definitely (greater than a 90 percent chance)

10. Suppose you set a goal to improve instruction in a particular area. What are the chances that you would make a detailed written plan including a list of forces that could restrain implementation before starting on the project?

    1. Almost none (less than a 10 percent chance)
    2. Maybe (about a 25 percent chance)
    3. Possibly (about a 50 percent chance)
    4. Almost always (about a 75 percent chance)
    5. Definitely (greater than a 90 percent chance)

11. Suppose you have an exciting idea for a new way of teaching that could really enhance the degree of learning of students, but suppose also that there is a possibility that the new approach might not go over at all. What are the chances that you would try out the new method anyway if there was a high risk that the new method would fail?

    1. Almost none (less than a 10 percent chance)
    2. Maybe (about a 25 percent chance)
    3. Possibly (about a 50 percent chance)
    4. Almost always (about a 75 percent chance)
    5. Definitely (greater than a 90 percent chance)

B. Suppose you develop a particularly useful and effective method for teaching something. What are the chances that you would: (Questions 12 and 13)

12. Describe it briefly at a faculty meeting and offer to meet with others who want to hear more about it?

    1. Almost none (less than a 10 percent chance)
    2. Maybe (about a 25 percent chance)
    3. Possibly (about a 50 percent chance)
    4. Almost always (about a 75 percent chance)
    5. Definitely (greater than a 90 percent chance)

13. Say nothing about it unless somebody asked you?

    1. Almost none (less than a 10 percent chance)
    2. Maybe (about a 25 percent chance)
    3. Possibly (about a 50 percent chance)
    4. Almost always (about a 75 percent chance)
    5. Definitely (greater than a 90 percent chance)

C. Suppose you wanted to improve your classroom effectiveness in some area. What are the chances that you would: (Questions 14, 15 and 16)

14. Ask another teacher to observe your teaching and then have a conference with you afterwards?

    1. Almost none (less than a 10 percent chance)
    2. Maybe (about a 25 percent chance)
    3. Possibly (about a 50 percent chance)
    4. Almost always (about a 75 percent chance)
    5. Definitely (greater than a 90 percent chance)

15. Ask another teacher to let you observe how he/she teaches in order to get an idea how to improve your own teaching methods and effectiveness?

    1. Almost none (less than a 10 percent chance)
    2. Maybe (about a 25 percent chance)
    3. Possibly (about a 50 percent chance)
    4. Almost always (about a 75 percent chance)
    5. Definitely (greater than a 90 percent chance)

16. Use a questionnaire to find out how your students feel about your teaching in some area?

1. Almost none (less than a 10 percent chance)
2. Maybe (about a 25 percent chance)
3. Possibly (about a 50 percent chance)
4. Almost always (about a 75 percent chance)
5. Definitely (greater than a 90 percent chance)

D. Suppose you are present when two other teachers get into a heated argument about how the school should be run. What are the chances that you would: (Questions 17, 18, 19, and 20)

17. Listen to both parties in the argument and then side with the one you think is right?

1. Almost none (less than a 10 percent chance)
2. Maybe (about a 25 percent chance)
3. Possibly (about a 50 percent chance)
4. Almost always (about a 75 percent chance)
5. Definitely (greater than a 90 percent chance)

18. Avoid getting involved in the interaction at all?

1. Almost none (less than a 10 percent chance)
2. Maybe (about a 25 percent chance)
3. Possibly (about a 50 percent chance)
4. Almost always (about a 75 percent chance)
5. Definitely (greater than a 90 percent chance)

19. Help each one in the argument to understand the viewpoint of the other?

1. Almost none (less than a 10 percent chance)
2. Maybe (about a 25 percent chance)
3. Possibly (about a 50 percent chance)
4. Almost always (about a 75 percent chance)
5. Definitely (greater than a 90 percent chance)

20. Try to get the two to quiet down and stop arguing?

1. Almost none (less than a 10 percent chance)
2. Maybe (about a 25 percent chance)
3. Possibly (about a 50 percent chance)
4. Almost always (about a 75 percent chance)
5. Definitely (greater than a 90 percent chance)

E. Suppose you strongly disagree with a procedure that the principal has outlined for all to follow. What are the chances that you would: (Questions 21, 22, and 23)

21. Go and talk with the principal about this disagreement?

1. Almost none (less than a 10 percent chance)
2. Maybe (about a 25 percent chance)
3. Possibly (about a 50 percent chance)
4. Almost always (about a 75 percent chance)
5. Definitely (greater than a 90 percent chance)

22. Say nothing but ignore the principal's directive?

1. Almost none (less than a 10 percent chance)
2. Maybe (about a 25 percent chance)
3. Possibly (about a 50 percent chance)
4. Almost always (about a 75 percent chance)
5. Definitely (greater than a 90 percent chance)

23. Say nothing but comply with the principal's directive?

1. Almost none (less than a 10 percent chance)
2. Maybe (about a 25 percent chance)
3. Possibly (about a 50 percent chance)
4. Almost always (about a 75 percent chance)
5. Definitely (greater than a 90 percent chance)

F. One of the frustrations in working in schools is that things don't always go as well as planned. Suppose something has gone wrong in your school--something that affects everyone and has everyone pretty upset. What are the chances that you would: (Questions 24, 25 and 26)

24. Make suggestions to the staff regarding who was responsible for things going wrong so accountability can be established the next time things go wrong?

1. Almost none (less than a 10 percent chance)
2. Maybe (about a 25 percent chance)
3. Possibly (about a 50 percent chance)
4. Almost always (about a 75 percent chance)
5. Definitely (greater than a 90 percent chance)

25. Remain quiet and wait for others to analyze the problem?

1. Almost none (less than a 10 percent chance)
2. Maybe (about a 25 percent chance)
3. Possibly (about a 50 percent chance)
4. Almost always (about a 75 percent chance)
5. Definitely (greater than a 90 percent chance)

26. Make suggestions to the staff about possible new arrangements to prevent this upsetting occurrence?

1. Almost none (less than a 10 percent chance)
2. Maybe (about a 25 percent chance)
3. Possibly (about a 50 percent chance)
4. Almost always (about a 75 percent chance)
5. Definitely (greater than a 90 percent chance)

G. Suppose you have worked hard in developing a new way for teaching something to your students. However, six months later you discover that achievement had not increased. In fact, several students are doing less well than before. What are the chances that you would: (Questions 27, 28, 29, 30, and 31)

27. Go and talk to the principal about what you had done?

1. Almost none (less than a 10 percent chance)
2. Maybe (about a 25 percent chance)
3. Possibly (about a 50 percent chance)
4. Almost always (about a 75 percent chance)
5. Definitely (greater than a 90 percent chance)

28. Say nothing but start working out another plan?

1. Almost none (less than a 10 percent chance)
2. Maybe (about a 25 percent chance)
3. Possibly (about a 50 percent chance)
4. Almost always (about a 75 percent chance)
5. Definitely (greater than a 90 percent chance)

29. Go and talk to another colleague about what you had done?

1. Almost none (less than a 10 percent chance)
2. Maybe (about a 25 percent chance)
3. Possibly (about a 50 percent chance)
4. Almost always (about a 75 percent chance)
5. Definitely (greater than a 90 percent chance)

30. Be very disappointed and feel a real sense of failure?

1. Almost none (less than a 10 percent chance)
2. Maybe (about a 25 percent chance)
3. Possibly (about a 50 percent chance)
4. Almost always (about a 75 percent chance)
5. Definitely (greater than a 90 percent chance)

31. Make a list to describe what's going well and what's getting in the way before you started to revise your plan or develop a new one?

1. Almost none (less than a 10 percent chance)
2. Maybe (about a 25 percent chance)
3. Possibly (about a 50 percent chance)
4. Almost always (about a 75 percent chance)
5. Definitely (greater than a 90 percent chance)

SCHOOL ACTIVITIES QUESTIONNAIRE

Directions

The purpose of the questions in this booklet is to find out what your class is like. This is not a "test." Your teacher will not see your answers and you do not have to put your name on the answer sheet.

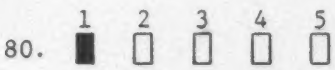
This is an example of the kind of questions you might be asked:

80. Do you like to come to school?

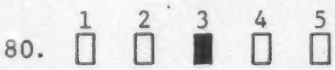
1. Yes
2. No
3. Sometimes

To answer this question, first decide if your answer is "Yes," "No," or "Sometimes." If your answer is "Yes," look at your answer sheet (the blue and white paper) and find Question 80. With your pencil darken Column 1 of Question 80.

Your answer on the answer sheet would look like this:



If your answer was "Sometimes," Number 3, your answer would look like this:



If you want to change an answer, be sure to erase your first answer and darken the column for your final answer.

Work as quickly as you can. The person administering the test will tell you when to stop.

PLEASE TRY TO GIVE YOUR HONEST FEELINGS ABOUT YOUR CLASS.

1. Do you like to come to school?

    1. Yes
    2. No
    3. Sometimes

2. Are you proud of the things you do in school?

    1. Very proud
    2. Proud of some things, not proud of others
    3. Not very proud

3. How often do you talk to a teacher by yourself about your school work?

    1. Two or three times a day
    2. About once a day
    3. About once a week
    4. Almost never

4. How often dc the students in your class talk to the teacher about how much time they should spend on an activity?

    1. More than once a day
    2. About once a day
    3. Two or three times a week
    4. Once a week
    5. Not very often

5. How do you usually feel when your teacher talks to you about your school work?

    1. Encouraged
    2. Don't know
    3. A little discouraged

6. In the classroom, the teacher usually calls on:

    1. The same group of students
    2. Almost all the students

7. In general, how are problems usually solved in your classroom?

    1. Our teacher solves the problems alone
    2. The teacher and the students work together

8. Do you have activities where the teacher has you tell someone else about something?

    1. No, haven't done that yet
    2. Not very often
    3. About once a week
    4. Yes, two or three times a week or more

9. Does your teacher know what is easy and what is hard for you?

   1. No, not very well
   2. Sometimes
   3. Yes, knows very well

10. Who decides what the class will do?

   1. The teacher usually decides by him/herself what the class will do
   2. We often plan with the teachers what we will do

11. Does your class have activities where many students get called on?

   1. No, haven't done that yet
   2. Not very often
   3. About once a week
   4. Yes, about once a day or more

12. How often does your teacher encourage you to try a different task?

   1. Almost never
   2. Sometimes, once a week or less
   3. Fairly often, two or three times a week
   4. About once a day
   5. Two or three times a day

13. Does your class have discussions about how the students should act?

   1. Yes
   2. Not very often
   3. No, generally the teacher tells us

14. How often do you spend <u>more</u> time on some activities than other students do?

   1. Fairly often, two or three times a week
   2. Sometimes, about once a week or less
   3. Almost never

15. Do you ever work on something that other students in your class are not working on?

   1. No, usually we work on the same thing
   2. Sometimes, about once a week or less
   3. Fairly often, two or three times a week

16. How often does your teacher let students decide how an activity or project should be done?

   1. Almost never
   2. Sometimes
   3. Most of the time

17. How often does your teacher permit a lot of talking and activities in your classroom?

1. A number of times a day
2. About once a day
3. The classroom is usually rather quiet

18. How often do other students in your class tell you that you have done a good job?

1. Not very often
2. About once a week
3. About two or three times a week
4. Once a day or more

19. Do you think your teacher knows what kinds of activities you like the most?

1. Not very well
2. I don't know
3. Yes

20. How often can you speak out in a classroom discussion when you want to?

1. Almost never
2. Not very often
3. Sometimes
4. Fairly often
5. Always

21. How often do you spend <u>less</u> time on some activities than other students do?

1. Fairly often, two or three times a week
2. Sometimes, about once a week or less
3. Almost never

22. How often do you have class activities where many students take turns speaking?

1. More than once a day
2. Once a day
3. Two or three times a week
4. About once a week
5. Not very often

23. How often does your teacher tell you about something you have done well?

1. Almost never
2. Sometimes, once a week or less
3. Fairly often, two or three times a week
4. About once a day
5. Two or three times a day

24. How often do you have class discussions where many students have something to say?

1. Haven't done that yet
2. Not very often
3. About once a week
4. Two or three times a week
5. About once a day or more

Name _____
Position _____
Trainer _____

RUPS POSTTRAINING QUESTIONNAIRE

The purpose of this questionnaire is to provide information about your views concerning the *RUPS* workshop. The information will be used to help us learn more about how workshop participants feel about the *RUPS* system. The questionnaire is intended to evaluate the workshop, NOT YOU. Please answer all of the following questions as honestly and completely as possible; all responses will be kept confidential.

A. The following questions (1-11) ask for your judgments about the success of the workshop in achieving its goals. Using the 5-point scale below please circle the number indicating how successful you would say the information, materials, practice exercises, and methods used in this workshop were in achieving the following goals.

1 Not at all successful	2 Barely successful	3 Somewhat successful	4 Successful	5 Extremely successful

	Not at all successful				Extremely successful
How successful do you feel the workshop was in:					
1. Providing clear information concerning directions and rationales for the different sessions.	1	2	3	4	5
2. Offering new insights, new ways of viewing old problems.	1	2	3	4	5
3. Addressing what you thought were important issues/vital concerns.	1	2	3	4	5
4. Demanding original thinking on your part.	1	2	3	4	5
5. Presenting clearly understandable definitions and descriptions of problem solving.	1	2	3	4	5

	Not at all successful				Extremely successful
6. Helping you understand the role and possibility of problem solving in schools.	1	2	3	4	5
7. Maintaining your interest throughout the workshop.	1	2	3	4	5
8. Providing useful skills and concepts for working with others outside your professional life.	1	2	3	4	5
9. Providing information with practical application for your work with students.	1	2	3	4	5
10. Providing information with practical application for your work with teachers.	1	2	3	4	5
11. Providing information with practical application for your work with superiors.	1	2	3	4	5

B. The following questions (12-23) are concerned with your understanding of the conceptual materials and your ability to apply the skills learned in this workshop. For each of the following concepts and skills, we would like you to respond to the question "How well do you feel you have a working understanding of..." on the following scale.

1	2	3	4
I don't understand the concept and could not apply the skills	I don't understand the concept but could apply the skills	I understand the concept but could not apply the skills	I understand the concept and could apply the skills

How well do you feel you have a working understanding of:					
12. Applying the 4-guideline criteria for writing a problem statement.	1	2	3	4	5
13. Using the forcefield diagnostic technique.	1	2	3	4	5
14. Selecting and creating instruments for data gathering.	1	2	3	4	5

15.	Using criteria for deriving implications from research findings.	1	2	3	4	5
16.	Spotting and analyzing major results of data collected.	1	2	3	4	5
17.	Brainstorming action alternatives to meet implications derived from findings.	1	2	3	4	5
18.	Applying guidelines for planning and implementing action alternatives.	1	2	3	4	5
19.	Evaluating solution plans.	1	2	3	4	5
20.	Paraphrasing interpersonal communications.	1	2	3	4	5
21.	Using concepts and skills of giving and receiving feedback.	1	2	3	4	5
22.	Diagnosing teamwork relations.	1	2	3	4	5
23.	Identifying and evaluating small group dynamics.	1	2	3	4	5

C. The following questions deal with how you feel about the workshop as a whole and about its usefulness for yourself and others.

24.	How successful do you feel this workshop was in meeting your expectations about what you personally wanted to get out of it?	Not at all successful				Extremely successful
		1	2	3	4	5
25.	How clearly did you understand the workshop's overall objectives?	Very clearly				Not at all
		1	2	3	4	5
26.	How successful do you feel the workshop was in achieving its overall objectives?	Extremely successful				Not at all successful
		1	2	3	4	5

27.	How useful do you feel the skills and concepts you have learned are in problem solving?	Very useful				Of no use
		1	2	3	4	5
28.	In all honesty, how much do you plan to use the ideas, skills and/or materials presented in this workshop as an integral part of your work?	Completely				Not at all
		1	2	3	4	5
29.	Now that the workshop is over, how would you sum up the experience?	Extremely worthwhile				Of no worth at all
		1	2	3	4	5
30.	Would you recommend this workshop to a friend whose interests are like yours?	Definitely recommend				Definitely not recommend
		1	2	3	4	5

WEEKLY LOG

In order that we may be able to judge the effectiveness of the *RUPS* training system, we would like you to keep a weekly log of whatever problem solving activities you engage in. Our interest is in evaluating the system and not your performance. Thus, we would appreciate your candid responses. There is no need to put your name on the forms and all information will be held strictly confidential.

On each Friday, from October 25 through December 20, we would like you to fill out a brief 14-item checklist indicating the frequency with which you engaged in certain problem solving activities during the last week. This checklist is labeled Form 1 and you will find a sample attached to these directions. You will note that the date you are to return the form is indicated at the top. On each Friday you would simply find the appropriately dated form, indicate the number of times you engaged in each activity in the last week, and return the form to us.

On every other week we ask that you fill out an additional form, Form 2, concerning the nature of the problems you have been working on during the preceding two weeks. Each problem you work on would require an additional Form 2, and since you may work on several problems during a 2-week period, we have included extra forms in the back of the folder. Form 2 asks you to briefly describe the nature of the problem you worked on and quickly indicate what you have done on the problem, and what difficulties and successes you have encountered. A sample copy of Form 2 is attached.

We have provided stamped return envelopes in the back of the folder along with extra copies of Form 1 and Form 2. Every Friday, then, you should complete the appropriately dated forms and mail them to us. We anticipate that it should take no longer than 15 to 30 minutes to complete the forms and drop them in the mail. We realize, however, that some Fridays you may feel you do not have the time. We would strongly urge you, however, to take the few minutes to complete the forms. If you wait several days, you will probably find it much more difficult to recall your past problem solving activities. Because it is very important for us to receive these forms on time, we will contact you by phone in the event that your forms become several days late.

We greatly appreciate your taking the time to keep this Weekly Log for us. If you have difficulties or questions concerning this Log or any other aspect of the *RUPS* training and data collection, please feel free to call one of the individuals below collect:

Name:	Nick Smith	Rachel Rassen
Office Phone:	(503)224-3650, ext. 323	(503)224-3650, ext. 267
Home Phone:	(503)649-4503	(503)234-8891

FORM 1

Please complete and mail this Form on Friday, _____.

In the spaces provided to the right, indicate how many times in the last week you engaged in the following activities that focused on classroom students or your faculty and colleagues.

OFFICE USE

Form [1] (1)

Week [ ][ ] (2 3)

No. [ ][ ][ ] (4 5 6)

Activity	Focus of Activity: Classroom Students	Focus of Activity: Faculty and Colleagues
1. Tried to make an actual statement of what a particular problem was.	[ ][ ]	[ ][ ]
2. Tried to identify potential difficulties and aids concerning a particular problem.	[ ][ ]	[ ][ ]
3. Made or got some tests or questionnaires to collect data about a problem.	[ ][ ]	[ ][ ]
4. Collected and analyzed data and thought about how the results applied to a particular problem.	[ ][ ]	[ ][ ]
5. Thought of or listed different solutions and plans of action to solve a problem.	[ ][ ]	[ ][ ]
6. Tried out possible solutions and plans of action to solve a problem.	[ ][ ]	[ ][ ]
7. Evaluated or revised solution plans for solving a problem.	[ ][ ]	[ ][ ]
8. Discussed general problem solving strategies.	[ ][ ]	[ ][ ]
9. Discussed specific problem solving procedures.	[ ][ ]	[ ][ ]
10. Suggested general problem solving strategies.	[ ][ ]	[ ][ ]
11. Recommended specified problem solving procedures.	[ ][ ]	[ ][ ]
12. Attended to problem of feedback and interpersonal communications.	[ ][ ]	[ ][ ]
13. Attended to problems of teamwork and group interactions.	[ ][ ]	[ ][ ]
14. Thought about or engaged in specific problem solving activities.	[ ][ ]	[ ][ ]

FORM 2

OFFICE USE

Form [2] (1)

Please complete and mail this Form on Friday, _____.

Please recall a particular problem you worked in the last two weeks and answer the following questions with it in mind. For each problem you worked on, complete a separate Form 2 indicating the date as above.

Week [ ] [ ] (2 3)

No. [ ] [ ] [ ] (4 5 6)

Briefly indicate the nature of the problem you worked on.

_____

_____

_____

Was this the problem you indicated at the workshop meeting that you would be working on? (check one) ___ yes (1) ___ no (0) [ ] (7)

Did you report on this problem on a Form 2 two weeks ago? (check one) ___ yes (1) ___ no (0) [ ] (8)

Check (✓) which of the following you have done on this problem. (1)

1. ___ Tried to make an actual statement of what a particular problem was. [ ] (9)
2. ___ Tried to identify potential difficulties and aids concerning a particular problem. [ ] (10)
3. ___ Made or got some tasks or questionnaires to collect data about a problem. [ ] (11)
4. ___ Collected and analyzed data and thought about how the results applied to a particular problem. [ ] (12)
5. ___ Thought of or listed different solutions and plans of action to solve a problem. [ ] (13)
6. ___ Tried out possible solutions and plans of action to solve a problem. [ ] (14)
7. ___ Evaluated or revised solution plans for solving a problem. [ ] (15)

Of the activities you have checked, which one did you have the most difficulty with? ____ [ ] (16)

If you had difficulty with another activity, which one? ____ [ ] (17)

How many hours have you spent working on this problem? ____ [ ] [ ] [ ] (18 19 20)

How many hours (_____) over how many weeks (____) will you probably need to complete the rest of your work? [ ] [ ] [ ] (21 22 23) [ ] [ ] (24 25)

115

FORM 2 (continued)

Check (√) below those difficulties you have had in working (1) on this problem.

OFFICE USE

1. ___ I am experiencing resistance from students. [ ] 26
2. ___ I am experiencing resistance from faculty. [ ] 27
3. ___ I lack sufficient time to work on the problem. [ ] 28
4. ___ I lack sufficient resources to work on the problem. [ ] 29
5. ___ I do not have administrative support. [ ] 30
6. ___ I do not have support from other teachers. [ ] 31

Check (√) how successful you feel you are in dealing with this particular problem. (1)

1. I am (check one): [ ] 32

   (1) ___ enthusiastic
   (2) ___ hopeful
   (3) ___ doubtful
   (4) ___ discouraged

2. I think I will be able to solve (check one)(1) ___ all, (2) ___ part, (3) ___ none of the the problem. [ ] 33

3. I will probably need (check one) (1) ___ much, (2) ___ some, (3) ___ no additional help or training to solve this problem. [ ] 34

4. If you attended the workshop training, how useful do you feel the training was in working on this problem? (check one) [ ] 35

   (1) ___ very useful
   (2) ___ moderately useful
   (3) ___ unuseful
   (4) ___ hampered my efforts

FOLLOWUP QUESTIONNAIRE

The purpose of this questionnaire is to obtain information about your feelings concerning the workshop you attended three months ago. Please answer all of the following questions as honestly and completely as possible. All responses will be kept completely confidential.

The following questions (32-38) ask for your judgments about the success of the workshop in achieving its goals. Using the 5-point scale below please circle the number indicating how successful you would say the information, materials, practice exercises, and methods used in this workshop were in achieving the following goals.

1 Not at all successful	2 Barely successful	3 Somewhat successful	4 Successful	5 Extremely successful

	Not at all successful				Extremely successful
How successful do you feel the workshop was in:					
32. Offering new insights, new ways of viewing old problems.	1	2	3	4	5
33. Addressing important issues, vital concerns.	1	2	3	4	5
34. Presenting a clearly understandable description of problem solving.	1	2	3	4	5
35. Providing useful skills and concepts for working with others outside your professional life.	1	2	3	4	5
36. Providing information with practical application for your work with students.	1	2	3	4	5
37. Providing information with practical application for your work with teachers.	1	2	3	4	5
38. Providing information with practical application for your work with superiors.	1	2	3	4	5

The following questions (39-45) deal with how you feel about the workshop as a whole and about its usefulness for yourself and others.

39. Compared to other workshops you have attended, how successful do you feel this workshop was in meeting your expectations about what you personally wanted to get out of it?

1 Extremely successful in meeting my expectations	2 Relatively successful	3 Neutral	4 Relatively unsuccessful	5 Not at all successful in meeting my expectations

40. How successful do you feel the workshop was in achieving its overall objectives?

1	2	3	4	5
Extremely successful	Relatively successful	Neutral	Relatively unsuccessful	Not at all successful

41. Compared to what you learned in other workshops, how useful do you feel the skills and concepts you have learned are in problem solving?

1	2	3	4	5
Very useful	Relatively useful	Neutral	Relatively useless	Useless

42. Now that the workshop is over, how would you sum up the experience?

1	2	3	4	5
Extremely worthwhile	Very worthwhile	Worthwhile	Barely worthwhile	Of no worth at all

43. Would you recommend this workshop to any of your friends or colleagues?

1	2	3	4	5
Definitely recommend	Possibly recommend	Recommend with reservations	Probably not recommend	Definitely not recommend

44. In relation to your expenditure of time and/or money, how valuable has the workshop been to you?

1	2	3	4	5
Extremely valuable	Moderately valuable	Of some value	Of limited value	Of no value

45. Compared to other workshops, how useful do you think the workshop would be as a training experience for your colleagues?

1	2	3	4	5
Very useful	Relatively useful	Neutral	Relatively useless	Useless

The following questions (46-57) are concerned with your understanding of the conceptual materials and your ability to apply the skills learned in this workshop. For each of the following concepts and skills, we would like you to respond to the question, "How well do you feel you have a <u>working understanding</u> of..." on the following scale.

1	2	3	4
I don't understand the concept and could not apply the skills	I don't understand the concept but could apply the skills	I understand the concept but could not apply the skills	I understand the concept and could apply the skills

How well do you feel you have a working understanding of:	1	2	3	4	5
46. Applying the 4-guideline criteria for writing a problem statement.	1	2	3	4	5
47. Using the forcefield diagnostic technique.	1	2	3	4	5
48. Selecting and creating instruments for data gathering.	1	2	3	4	5
49. Using criteria for deriving implications from research findings.	1	2	3	4	5

50.	Spotting and analyzing major results of data collected.	1	2	3	4	5
51.	Brainstorming action alternatives to meet implications derived from findings.	1	2	3	4	5
52.	Applying guidelines for planning and implementing action alternatives.	1	2	3	4	5
53.	Evaluating solution plans.	1	2	3	4	5
54.	Paraphrasing interpersonal communications	1	2	3	4	5
55.	Using concepts and skills of giving and receiving feedback.	1	2	3	4	5
56.	Diagnosing teamwork relations	1	2	3	4	5
57.	Identifying and evaluating small group dynamics.	1	2	3	4	5

Appendix C:

PSYCHOMETRIC EVALUATION OF THE PROBLEM SOLVING ORIENTATION QUESTIONNAIRE

This is a technical note designed to present psychometric information which may be used in evaluating a self-report attitude instrument called the Problem Solving Orientation Questionnaire (PSOQ). The PSOQ was developed specifically for the evaluation of *Research Utilizing Problem Solving (RUPS)*, an instructional system designed for training teachers in a generic problem solving model for classroom application. The PSOQ is a self-report questionnaire designed to measure certain aspects of the orientation of teachers toward problem solving. Respondents are presented with a variety of realistic problem situations and asked to estimate the probability of their reacting in a manner consistent with the "action research" orientation toward problem solving advocated in *RUPS* training. Responses to items are made on a 5-point multiple choice scale identical to that in the following sample item.

> Suppose something has gone wrong in your school--something that affects everyone and has everyone upset. What are the chances that you would remain quiet and wait for others to analyze the problem?
>
> 1. Almost none (less than a 10 percent chance)
> 2. Maybe (about a 25 percent chance)
> 3. Possibly (about a 50 percent chance)
> 4. Almost always (about a 75 percent chance)
> 5. Definitely (greater than a 90 percent chance)

The items from the PSOQ were categorized according to two classification schemes determined by the content of the situation presented in the item stem. The first classification scheme divides the situations described in the PSOQ into two categories: (a) situations dealing primarily with interpersonal relationships, and (b) situations dealing primarily with task accomplishment.

The second classification scheme also divides the situations described in the PSOQ into two categories: (a) situations related to

classroom problem solving activities, and (b) situations related to nonclassroom problem solving activities. Scores for each set of items were the sum of the responses to each item within that category.

Two developers of the *RUPS* instructional system and four evaluators who had never received *RUPS* training were instrumental in assigning the items to the categories described above. Each developer and evaluator received a complete PSOQ, with each item printed on an index card. They were instructed to work independently and assign items either to a task orientation category or to an interpersonal orientation category. Items which the evaluators and developers could not unanimously assign to these two categories were not scored. Of the 31 items in the PSOQ, only two were eliminated because of lack of unanimity. Twelve items were classified as dealing with tasks and seventeen with interpersonal relationships.

The same procedure of sorting cards was followed for the classroom and nonclassroom categories. Twelve items were placed in the classroom situation category, seventeen items were placed in the nonclassroom situation category and two items were deleted due to lack of unanimity.

Pretraining data from a sample of 87 teachers who responded to the PSOQ were used to calculate split half reliabilities, which were corrected with the Spearman Brown Prophecy formula. These 87 teachers were participants in *RUPS*, two other NWREL workshops, or members of the control group used in an evaluation study.

In addition to the split-half reliabilities, test-retest reliabilities were computed with the same group of 87 teachers. Since the test-retest reliabilities were based upon pretraining and posttraining administrations designed to assess training effects, the test-retest relaibilities should be interpreted as conservative estimates.

Because both pretest and posttest information were available for analysis, the data were analyzed in a multitrait-multioccasion matrix of intercorrelations. Two tables are required as the four scales employed were not mutually exclusive with respect to items. Categories within classification schemes were mutually exclusive, however, and Table A includes the intercorrelations for the task accomplishment scale and the interpersonal relationships scale. A multitrait-multioccasion matrix is used because it provides two indices of scale reliability (split-half and test-retest) and concurrent and predictive intercscale relationship all in one table. It, therefore, provides an overview of a variety of scale characteristics in a single table.

Table A

Multitrait-Multioccasion Intercorrelations of Task Accomplishment and Interpersonal Relationships PSOQ Scales[a]

		Pre		Post	
		Task Accomplishment	Interpersonal Relationships	Task Accomplishment	Interpersonal Relationships
Pre	Task Accomplishment	*.71*[b]			
	Interpersonal Relationships	.55	*.37*[b]		
Post	Task Accomplishment	*.81*[c]	.40	--	
	Interpersonal Relationships	.34	*.44*[c]	.54	--

[a]N=87.
[b]Corrected split half reliabilities.
[c]Test-retest reliabilities.

The italicized correlations are reliability coefficients. Those reliability coefficients in the pretest portion of the matrix are split-half reliabilities with corrections made according to the Spearmen

Brown Prophecy formula. Similar reliabilities were not calculated for the posttest administration. Test-retest reliabilities are placed in the cross occasion (i.e., pre-post) portion of the matrix. The task accomplishment scale was more reliable than the interpersonal relationships scale indicating that it may have greater potential value for evaluation purposes. Within occasion the interpersonal relationships scale correlated less with itself (i.e., split-half reliability) than it did with the task accomplishment scale. To have much confidence in a scale the reliabilities should be higher than interscale correlations. Therefore, further doubt is cast on the value of the interpersonal relationships scale.

The pretraining and posttraining interscale and within-occasion correlations were very nearly identical. Task accomplishment correlated .55 for the pretraining data with interpersonal relationships and .54 for the posttraining data. This pair of concurrent interscale correlations indicate a form of stability in the relationships between the scales. As expected, these interscale and within-occasion correlations were higher than the interscale and between-occasion correlations which were .34 and .40.

Table B includes the intercorrelations for the classroom situations and nonclassroom situations scales. The classroom situations scale possessed greater reliability than the nonclassroom situations scale. While the reliability of the nonclassroom situations scale was higher than this scale's intercorrelation with the classroom situations scale, the reliabilities were not high in absolute terms.

Table B

Multitrait-Multioccasion Intercorrelations of Classroom Situation and Nonclassroom Situation PSOQ Scales[a]

		Pre		Post	
		Task Accomplishment	Interpersonal Relationships	Task Accomplishment	Interpersonal Relationships
Pre	Task Accomplishment	.60[b]	.32		
	Interpersonal Relationships	.32	.38[b]		
Post	Task Accomplishment	.61[c]	.21	--	
	Interpersonal Relationships	.18	.44[c]	.34	--

[a]N-87.
[b]Corrected split half reliabilities.
[c]Test-retest reliabilities.

Interscale and within-occasion correlations were nearly identical classroom situations correlated with nonclassroom situations .32 for the pretraining and .34 for the posttraining data. Again, these intercorrelations were higher than the interscale and between-occasion intercorrelations which were .18 and .21.

Appendix D:

DESCRIPTIONS AND PSYCHOMETRIC DATA FOR CLIMATE SCALES USED IN THE EVALUATION OF *RESEARCH UTILIZING PROBLEM SOLVING, INTERPERSONAL INFLUENCE* AND *GROUP PROCESS SKILLS*

INTRODUCTION

Outcome evaluations of three of the instructional systems developed by the Improving Teaching Competencies Program (ITCP) have involved the use of various measures of classroom climate. This appendix presents the sources of those measures, a brief summary and evaluation of the psychometric data available on the instruments and a summary of psychometric data obtained from the Northwest Regional Educational Laboratory (NWREL) evaluation studies.

The instructional systems being evaluated through the classroom climate measures included *Research Utilizing Problem Solving (RUPS)*, *Interpersonal Influence (INF)*, and *Group Process Skills (GPS)*, which is part of the instructional system *Preparing Educational Training Consultants I (PETC-I)*. While these instructional systems are independent, they all focus heavily upon interpersonal skills and processes. That is, much of the training is designed to focus explicit attention on interpersonal processes and to heighten awareness of certain aspects of interpersonal relationships. All three systems are designed to be appropriate for classroom teachers and are intended to have some effects on their behavior.

The climate measures used in evaluating these instructional systems included scales selected from four instruments, the Student Activities Questionnaire, My Class Inventory, Student Attitude and Activity Survey, and the Student Behavioral Description Questionnaire.

Structure of the Appendix

This appendix has been divided into two sections. The first section includes a description of the climate scales and a brief summary

and evaluation of the published psychometric data available on the instruments. The second section includes reliability data in the form of intraclass correlations and test-retest reliabilities as well as scale intercorrelations computed from data collected in the ITCP evaluation studies.

DESCRIPTIONS OF SCALES AND PUBLISHED PSYCHOMETRIC INFORMATION

Student Activities Questionnaire

The Student Activities Questionnaire was constructed for the evaluation of an ESEA Title III project, Project IMPLODE, which was hypothesized to impact upon classroom climate. It was designed to emphasize the impact of the classroom process rather than its input to the educational system. That is, to determine the traits or abilities of the students. A description of the item generation and piloting procedures is presented in "The Measurement of Academic Climate in Elementary Schools" (Ellison, Callner, Fox and Taylor, 1973). The questionnaire contains sixty multiple-choice items and eight scales. Five of the eight scales have been used for the ITCP evaluation work. One scale of the Student Activities Questionnaire was dropped because it was designed as an implementation measure for Project IMPLODE. Hence, it was not expected to be relevant to *RUPS*, *INF* or *GPS* training. Two additional scales (Career Development and Independent Development) were judged to be of low relevance to the instructional systems developed by the ITCP. The scales which were used included:

Enjoyment of School: A measure of students' enjoyment of class activities and school work

Reinforcement of Self-Concept: A measure of the amount of positive feedback received by students, either through personal contact or structured class activities

Classroom Participation: A measure of student participation in class activities--frequency of class discussions, number of students who typically participate and opportunities for participation

Democratic Classroom Control: A measure of the amount of student input into classroom decision making, planning of individual activities and enforcement of rules

Individualization of Instruction: A measure of the extent that students perceive their teachers as sensitive to their own individual needs, progress and goals

Published psychometric data for the Student Activities Questionnaire consists of scale intercorrelations, intraclass correlation coefficients for each item and additional construct validity evidence in the form of treatment and comparison group differences.

With a sample of 654 fifth and sixth grade students, scale intercorrelations of all 8 of the SAQ scales ranged from .14 to a .49, except for the multiple talent teaching and career development scales which contained some common items. (These two scales were not selected for the evaluation of ITCP systems.) Of the five scales selected for use, the interscale correlations ranged from .14 to .42. The mean interscale correlation for the five selected scales was .26 as opposed to the mean interscale correlation of .35 for the full set of 8 scales on the Student Activities Questionnaire. This indicated greater scale independence among the five scales used than among all eight of the scales. In other words, the more redundant scales were not used.

Item reliability information in the form of intraclass correlation coefficients is available on all of the questionnaire items. Of the intraclass correlations, 33 were significant at the .01 level, 8 were significant at the .05 level, and 18 were nonsignificant. Of the 5 scales selected, 15 intraclass Rs were significant at the .01 level, 5 were significant at the .05 level, and 9 were nonsignificant. The items selected appeared to be neither more nor less reliable than the complete set of 60 Student Activities Questionnaire items.

Additional construct validity evidence available for the Student Activities Questionnaire is that mean comparisons between the experimental and control schools in the Project IMPLODE evaluation resulted in significant differences in the expected direction in all scales except individualization of instruction.

Student Attitude and Activity Survey (SAAS)

The SAAS was developed as a part of a Utah ESEA, Title III Project, the Utah System Approach to Individualized Learning (U-SAIL) (Nelson, 1973). It was developed to assess outcomes of an affective nature as well as student perceptions of certain process considerations. Many of the scales of the SAAS were developed to conceptually parallel the concepts measured with the Student Activities Questionnaire. There are two forms of the SAAS, a Primary Form appropriate for Grades 2 through 4, and an Intermediate Form intended for use with Grades 5 and 6. There are 17 scales included in the SAAS. Many of them, however, were developed as measures of implementation for the U-SAIL project and were not appropriate for evaluation of the three instructional systems.

The scales which were used include general climate, reinforcement of self-concept, general school sentiment, use of process approach, and participation in individualized learning strategies. All of these scales came from the Intermediate Form of the SAAS.

Published reliability information on the SAAS is limited to communalities obtained in a factor analysis of the SAAS variables. The reported communalities range from .71 through .77. There was, however, no reported reliability estimate for the use of process approach variable.

My Class Inventory (MCI)

The MCI was developed to conceptually parallel the Learning Environment Inventory for elementary level school children. The complete MCI includes 45 items in 5 scales: satisfaction, friction, competitiveness, difficulty and cohesiveness. (The difficulty scale is not being used in the ITCP evaluation work.) The scale reliabilities

of the MCI ranged from .54 through .77, based upon an analysis of data from a sample of 655 subjects. There was no validity information reported in the manual for the MCI (Anderson, 1973), for it was still in development at the time it was selected for use in the evaluation of the ITCP training systems.

Student Behavior Description Questionnaire (SBDQ)

The SBDQ was developed to assess the interpersonal needs of high school and junior high school students (Croft, 1966). Although the complete SBDQ taps interpersonal variables in terms of relationships with parents, friends and teachers, only the three scales measuring relationship with teacher factors were used in the evaluation of the three instructional systems of the ITCP. Student perceptions of relationships with parents and friends are not likely linked to the training offered in *RUPS*, *GPS* or *INF*.

The SBDQ was developed primarily through factor analytic techniques. Thus, the scales are relatively homogenous and independent.

PSYCHOMETRIC INFORMATION AVAILABLE FROM IMPROVING TEACHING COMPETENCIES PROGRAM EVALUATION STUDIES

Design Essentials

Psychometric evaluations conducted with data actually used in an evaluation study are potentially more useful than published psychometric information in analyzing technical limitations of the instruments as used. Data from the 18 climate scales collected in the evaluations of *RUPS*, *INF* and *GPS* were used for further psychometric evaluations.

The psychometric information presented in Table A includes scale reliabilities, intraclass correlations (Haggard, 1958) and test-retest reliabilities as well as scale intercorrelations. Since the evaluation designs for these studies included pretraining and posttraining administrations of the climate scales, there are two intraclass correlations for each climate scale as well as a test-retest reliability for each climate scale.

Data collected for these analyses came from fourth, fifth, and sixth grade students in the classrooms of teachers assigned to one of three training groups (*RUPS*, *INF* and *GPS*) or a control group. Specific recruitment and sampling procedures are described earlier in this report and in the *Interpersonal Influence Field Test Impact Study and Expert Review* (Hiscox, Cutting and George, 1976). Readers interpreting Table A of intercorrelations and reliabilities should be aware of three cautions:

1. Few teachers were randomly assigned to the four groups. However, recruitment procedures were quite similar. Thus, the nonrandom assignment of teachers to groups is not expected to have a major impact on the reliabilities and scale intercorrelations for the combined samples.

2. The sample sizes, in terms of teachers or classrooms, for these reliabilities and scale intercorrelations differ from scale to scale for two reasons:

   a. While students in the classrooms of teachers in the *INF*, *GPS* and control groups responded to all of the climate scales treated in Table B, the students in the classrooms of teachers in the *RUPS* group responded to only five of the eighteen scales. (The five scales are marked with an (a) in the table.) As a result the number of classrooms associated with pretest scores for the five scales marked with an (a) is 84, while the number of classrooms associated with the other pretest scores is 52. The number of classrooms associated with posttest scores for the scales with an (a) is 73 and the number of classrooms associated with the other posttest scores is 44. Sample sizes for pretest and posttest data are included in Table B.

   b. The original total sample size for these combined studies involved 107 teachers rather than the 84 teachers for whom pretest data were available. There was 21 percent missing or unusable data for the pretest scores and 32 percent missing or unusable data for posttest scores. The specific impact of these missing data is not known.

3. The climate inventories were administered differently in the studies. All of the students in the classrooms of *RUPS*-trained teachers responded to the five scales from the SAQ. However, since data from 18 scales rather than just 5 scales were needed for the classrooms of the *INF*, *GPS* and control groups, different

Table A

Trait-Time Matrix for Climate Inventory Scales Using Combined *NUSS, IMF, GPS* and Control Data

			PRE																POST															
			MCI				SAQ						SAAS					SBDQ				MCI				SAQ						SAAS					SBDQ		
			S	F	Cm	Ch	ES	SC[a]	CP[a]	II[a]	DCC[a]	SAQ[a]	C	R	G	P	I	TC	TT	D	S	F	Cm	Ch	ES	SC[a]	CP[a]	II[a]	DCC[a]	SAQ[a]	C	R	G	P	I	TC	TT	D
PRE	MCI	Satisfaction (S)	.53																																	
		Friction (F)	.06	.48																																
		Competitiveness (Cm)	.35	.14	.29																															
		Cohesiveness (Ch)	.37	.25	.34	.58																														
	SAQ	Enjoyment of School (ES)	-.42	-.01	-.14	.15	.08																													
		Reinforcement of Self-Concept (SC)[a]	-.03	-.12	.20	-.19	-.19	.36																												
		Classroom Participation (CP)[a]	-.24	.19	-.27	.00	.37	.44	.72																											
		Individualization of Instruction (II)[a]	-.06	.00	-.01	.00	-.05	.00	-.16	.21																										
		Democratic Classroom Control (DCC)[a]	-.24	.10	-.17	.06	.34	-.13	.23	.11	.79																									
		SAQ[a]	-.27	.07	-.21	-.12	.22	.53	.71	.30	.64	.57																								
	SAAS	Climate (C)	.02	.32	-.14	.04	.02	.12	-.03	.05	-.03	.05	.64																							
		Reinforcement of Self-Concept (R)	.19	.16	-.00	.21	-.01	.11	-.13	-.10	.11	.01	.57	.42																						
		General School Sentiment (G)	.06	.36	-.25	-.10	-.17	-.04	.20	-.05	.07	.07	.61	.53	.64																					
		Process Approach (P)	-.12	.25	.04	.04	.15	.24	-.04	.04	-.03	.11	.32	.26	.12	.42																				
		Individualized Approach (I)	-.07	-.17	.01	.11	-.06	.41	-.20	.10	-.18	.09	.19	.11	.10	.13	.71																			
	SBDQ	Teacher Consideration (TC)	-.01	.37	-.14	.05	.09	.06	-.10	-.19	.07	-.05	.65	.64	.48	.33	.04	.74																		
		Teacher Thrust (TT)	-.02	.33	-.16	.01	.27	.01	-.07	-.17	.22	.03	.55	.53	.33	.42	.05	.84	.70																	
		Teacher Domination (D)	-.22	-.11	.06	.05	.33	-.23	.12	-.03	-.06	-.12	-.48	-.53	-.41	-.25	-.15	-.49	-.43	.51																
POST	MCI	Satisfaction (S)	.18	.17	-.01	.07	-.18	-.02	.01	-.14	-.19	-.16	.40	.36	.44	.20	-.04	.39	.18	-.21	.64															
		Friction (F)	.06	.07	.11	.09	-.04	.03	-.03	-.01	-.05	-.03	.00	-.05	-.04	-.22	.06	.01	-.02	.01	-.54	.43														
		Competitiveness (Cm)	.19	.00	.25	.15	.32	-.18	-.11	.13	.01	-.19	-.20	-.27	-.33	-.17	-.01	-.18	-.01	.04	-.20	.05	.57												
		Cohesiveness (Ch)	.03	.22	.05	.18	.10	-.03	.37	.05	-.14	.07	.20	-.10	.13	.10	-.27	.15	.14	-.03	.30	-.01	.05	.17												
	SAQ	Enjoyment of School (ES)	-.07	.16	.07	.01	.07	-.02	.05	.03	-.12	-.05	.19	.26	.23	.20	-.21	.37	.29	-.01	.43	.02	-.12	-.43	.25											
		Reinforcement of Self-Concept (SC)[a]	.07	.01	-.06	-.15	.11	.28	.28	-.06	.09	.27	.03	.02	.12	.22	.25	.08	.09	-.14	.22	-.20	.20	-.33	.07	.27										
		Classroom Participation (CP)[a]	-.12	-.22	-.23	-.31	-.07	.17	.59	-.30	.15	.33	-.16	-.12	.09	-.17	-.24	-.09	-.15	.14	.29	-.27	-.13	-.03	.08	.22	.58									
		Individualization of Instruction (II)[a]	.34	-.07	.26	.19	.06	.01	-.04	.12	.11	.08	-.17	-.01	-.09	-.15	.16	-.28	-.23	-.05	.06	-.13	.15	-.31	-.13	.22	.02	.33								
		Democratic Classroom Control (DCC)[a]	.30	-.08	-.08	.01	-.22	.05	.27	.01	.45	.41	-.04	.01	.18	-.13	.00	-.11	-.13	-.06	.36	-.29	-.34	-.07	-.17	.21	.61	.31	.72							
		SAQ[a]	.25	-.14	-.03	-.09	-.06	.17	.42	-.00	.34	.42	.13	-.04	.12	-.10	.07	-.16	-.17	-.05	.36	-.34	-.06	-.28	-.17	.61	.63	.59	.79	.49						
	SAAS	Climate (C)	.23	.32	.14	.01	-.36	.23	-.09	-.07	-.11	.01	.74	.45	.53	.33	.07	.51	.46	-.45	.42	-.05	-.28	.18	.11	-.11	-.02	-.06	.23	.03	.58					
		Reinforcement of Self-Concept (R)	.34	.27	.18	.26	-.25	.14	.06	-.16	.05	.06	.50	.62	.58	.16	.14	.48	.44	-.51	.19	.06	-.21	.04	-.05	-.19	-.02	-.04	.23	.01	.62	.64				
		General School Sentiment (G)	.26	.35	.31	.13	-.23	.18	.05	-.12	-.26	-.09	.54	.50	.58	.31	.01	.51	.43	-.41	.34	.09	-.22	.16	.14	-.00	-.06	.05	-.02	-.01	.70	.58	.63			
		Process Approach (P)	.05	.05	.08	-.05	-.00	.17	.01	-.09	-.02	.05	.19	.34	.27	.48	.05	.18	.25	-.09	.24	-.13	-.33	.01	.16	.14	.10	-.05	.05	.09	.34	.27	.43	.41		
		Individualized Approach (I)	-.01	.16	.09	-.01	-.22	.29	-.11	.08	.08	.17	.22	.28	.27	.22	.49	.20	.20	-.14	-.13	.10	-.24	-.39	-.13	-.01	-.26	.07	.01	-.06	.27	.34	.31	.24	.64	
	SBDQ	Teacher Consideration (TC)	.25	.39	.18	.26	-.17	.19	-.04	-.06	-.05	.03	.70	.61	.65	.34	.19	.65	.60	-.44	.43	-.13	-.19	.12	.10	.04	-.13	-.02	.19	.04	.78	.73	.75	.42	.36	.69
		Teacher Thrust (TT)	.31	.44	.26	.21	-.12	.06	.08	-.12	-.04	-.00	.57	.48	.58	.45	.17	.46	.48	-.28	.39	-.13	-.05	.09	.12	.15	-.07	-.00	.15	.09	.73	.63	.73	.66	.38	.85	.56
		Teacher Domination (D)	.00	-.14	-.04	.13	.20	-.25	.17	-.00	.04	-.06	-.43	-.37	-.51	-.16	-.31	-.50	-.46	.60	-.02	-.17	.00	.09	-.09	-.26	.20	-.18	-.01	-.06	-.49	-.50	-.53	-.11	-.33	-.51	-.45	.63

[a]The 6th sample responded only to these five scales. All other samples responded to all scales given in this table.

Table B

Number of Classrooms and Students for Whom Climate Data Were Analyzed on *RUPS*, *INF*, *GPS* and Control Groups

Scale	Pre		Post	
	Number of Classrooms	Number of Students	Number of Classrooms	Number of Students
Satisfaction	52	721	44	494
Friction	52	721	44	494
Competitiveness	52	721	44	494
Cohesiveness	52	721	44	494
Enjoyment of School	52	721	44	494
Reinforcement of Self-Concept[a]	84	1499	73	1213
Classroom Participation[a]	84	1499	73	1213
Democratic Classroom Control[a]	84	1499	73	1213
Individualization of Instruction[a]	84	1499	73	1213
SAQ Total[a]	84	1499	73	1213
Climate	52	697	73	509
Reinforcement of Self-Concept	52	697	44	509
General School Sentiment	52	697	44	509
Process Approach	52	697	44	509
Individualized Approach	52	697	44	509
Teacher Consideration	52	697	44	509
Teacher Thrust	52	697	44	509
Teacher Domination	52	697	44	509

[a]The *RUPS* sample responded only to these five scales. All other samples responded to all scales given in this table.

administration procedures were required for those three groups. The 18 climate scales were divided into two questionnaires, Forms A and B. The students in each of the classrooms of the *INF*, *GPS* and control group teachers were then randomly assigned to two groups. Students in one of these groups (for each classroom) responded to Form A and students in the other group responded to Form B. Therefore, classroom means for the *RUPS* teachers are based upon all students in each class. Classroom means for *INF*, *GPS* and the control teachers are based upon a random half of the students in each classroom. One of the results of this procedure is that the intraclass reliabilities for the scales not used in the *RUPS* study are slightly lower than they would have been if all students in all groups had responded to all scales.

Interpretation of Table A (Reliabilities)

The interpretation of Table A is limited here to an examination of the reliabilities presented. The intraclass correlations for each scale are presented along the major (larger) diagonal in Table A. The intraclass correlation is a measure of reliability based upon the ratio of between class variance minus within class variance to between class variance. The greater the agreement among students in the same classroom, given consistent differences between classrooms, the greater the intraclass correlation. The intraclass correlation, then, is a measure of relative agreement within predefined groups. It can be interpreted as any reliability coefficient where true score is defined as differences in classroom means and error is defined as within class variance. Since

the intraclass correlation is based upon one test administration, there are two intraclass correlations for each scale, one for the pretest and one for the posttest.

Test-retest reliabilities, in the minor (smaller) diagonal, were based upon a pretraining and posttraining administration of the climate scales. They must be viewed then as conservative estimates of stability.

My Class Inventory (MCI). Pretest intraclass correlations for the MCI scales ranged from .29 ($p < .033$) for competitiveness to .58 ($p < .001$) for cohesiveness.

Posttest intraclass correlations ranged from .17 ($p < .180$) for cohesiveness to .64 ($p < .001$) for satisfaction. The most consistently reliable scale from the MCI was the satisfaction scale with intraclass correlations of .53 ($p < .001$) and .64 ($p < .001$). Test-retest reliabilities for the MCI scales were quite low, ranging from -.03 to .25.

Student Activities Questionnaire. Pretest intraclass correlations for this questionnaire ranged from .08 ($p < .317$) for enjoyment of school to .79 ($p < .001$) for democratic classroom control. Posttest intraclass correlations ranged from .25 ($p < .078$) for enjoyment of school to .72 ($p < .001$) for democratic classroom control. Recall that the enjoyment of school intraclass reliabilities are based upon fewer classrooms and fewer students per classroom than for the rest of the scales. Test-retest reliabilities ranged from .07 for enjoyment of school to .59 for classroom participation. Clearly the enjoyment of school scale is much less reliable than the rest of the scales. The two most reliable scales from this questionnaire were classroom participation and democratic classroom control.

Student Attitude and Activity Survey (SAAS). Pretest intraclass correlations from the SAAS ranged from .42 ($p < .002$) for both climate

and process approach to .71 ($p < .001$) for individualized approach. Posttest intraclass correlations ranged from .41 ($p < .004$) for process approach to .64 ($p < .001$) for reinforcement of self-concept and individualized approach. Test-retest reliabilities ranged from .48 for process approach to .74 for climate. Test-retest reliabilities for the SAAS scales were much higher than those for the MCI scales while they were based upon approximately the same number of students and classrooms. One design difference which may have been a factor, however, was that the MCI was part of Form A and the SAAS was part of Form B. Thus, different students were the respondents for these two sets of scales.

Student Behavior Description Questionnaire (SBDQ). Pretest intraclass correlations for the SBDQ ranged from .53 ($p < .001$) for teacher domination to .74 ($p < .001$) for teacher consideration. Posttest intraclass correlations ranged from .43 ($p < .003$) for teacher domination to .69 ($p < .001$) for teacher consideration. Test-retest reliabilities ranged from .48 for teacher thrust to .65 for teacher consideration. Test-retest reliabilities for the SBDQ scales were similar to those for the SAAS and much higher than those for the MCI. Again design differences, specifically inclusion of the SBDQ and SAAS in Form B and the MCI in Form A, may account for the similarities and differences.

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Appendix E:

UNCORRELATED t-VALUES FOR *RESEARCH UTILIZING PROBLEM SOLVING* POSTTRAINING AND FOLLOWUP QUESTIONNAIRES

t-Values for *RUPS* Posttraining and Followup Questionnaires[a]

Topic	Variables	Posttraining		Followup		*t-Value*	*df*	*p-Value*
		$\bar{X}$	SD	$\bar{X}$	SD			
Satisfaction	2-32	4.14	.89	3.68	1.03	-2.06	72	.05
	3-33	3.46	1.10	3.24	.93	-.92	72	.26
	5-34	3.68	.88	3.51	1.10	-.70	72	.31
	26-40	2.19	.89	2.54	.84	1.74	71	.27
	29-42	2.05	1.13	2.75	.87	2.96	71	.01
	30-43	2.03	1.24	2.27	1.19	.86	72	.28
Use and Application	8-35	3.83	.88	3.43	1.12	-1.71	71	.21
	9-36	3.95	.88	3.46	1.10	-2.10	72	.04
	10-37	3.49	.80	3.57	1.07	.36	72	.37
	11-38	3.35	.82	3.19	.94	-.78	72	.29

[a]The scale for items 26, 29 and 30 (40, 42 and 43) is reversed.

Appendix F:

RESPONSES TO THE FOLLOWUP
QUESTIONNAIRE: OPEN-ENDED QUESTION

Question 31: Now that you have been away from the workshop for some time, have you changed your opinion of how useful it was?

No

No

No

No, I feel same.

No

Yes. I got tired of coming here. But time has shown that I really use many of the techniques.

No, I still feel the *RUPS* process is *not* applicable on a day to day problem; but because of all the steps of *RUPS* would be only useful for major problems and one which you have a great amount of time to work with.

No

No

Yes, I feel negative! I think much could be consolidated and the use of manipulation could be incorporated. I've been to a communications workshop which presented many of the same ideas, but we got into different groups, had objects to work with (a physical problem to work on). It made it more interesting and more bearable.

No, I always felt that the workshop was useful, but I think I could have had a little more guidance through writing out my force field and force field analysis--for some incorrect forces that might have been stated in my force field and analysis.

No!

Yes. In use it was often too cumbersome and time consuming. Some portions clearly emerged as being more useful than others.

No

No; it's quite useful.

No, I've felt from the beginning it would be useful and it was.

No

No

No, when I had a successful small *RUPS* class project, it made me feel better. Also I can see how I could introduce a *RUPS* project again to my faculty.

Same feelings.

Yes. I thought I would ignore the concepts presented and not put them into practice, but I haven't. *Good.*

After the weekend sessions I experienced much enthusiasm about implementing my newly gained skills.

No

No

No. I feel I've learned much, even though I might not go through the full process recommended by the course.

It was useful.

No. I find it has made me more aware of classroom problems, the feasibility of discussing it with my class and coworkers. I find then I'm not alone on a particular problem.

No, but it is more time consuming than I had anticipated.

No

No. Personally, I'll use parts of *RUPS* process, not the whole thing.

RESEARCH UTILIZING PROBLEM SOLVING: SUMMARY OF OUTCOME EVALUATION REPORT

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February 1976

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February 1976

Published by the Northwest Regional Educational Laboratory, a private nonprofit corporation. The work upon which this publication is based was performed pursuant to Contract NE-C-00-3-0072, with the Basic Skills Group/Learning Division of the National Institute of Education. It does not, however, necessarily reflect the views of that agency.

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PREFACE

This publication is one of a series of summary evaluation reports issued by the Northwest Regional Educational Laboratory to document evaluation findings for selected products. The subject of this report is *Research Utilizing Problem Solving (RUPS)*, an instructional system developed in the Improving Teaching Competencies Program.

This report summarizes the technical report *Research Utilizing Problem Solving: Outcome Evaluation Report* which presents the data collected about the impact of the system on the classrooms of teachers trained in two *RUPS* workshops. The information is intended to provide evidence related to the impact of *RUPS* training on students. Although this information is primarily summative in nature, it should also help those who may be considering modifying the system to increase the likelihood of achieving impact on students.

An institutional technical review has been conducted by Laboratory specialists external to the Program. Qualified evaluation consultants external to the Laboratory have also reviewed this report.

Lawrence D. Fish
Executive Director

INTRODUCTION

The purpose of this report is to summarize the *Research Utilizing Problem Solving: Outcome Evaluation Report*[1] prepared by the Improving Teaching Competencies Program (ITCP) of the Northwest Regional Educational Laboratory (NWREL). The full report includes evaluative data on trainee attitudes toward the *Research Utilizing Problem Solving (RUPS)* instructional system, trainee attitudes toward themselves, trainee behavior and classroom impact. The reader is referred to the full technical report for specific design details related to the sampling, instrumentation and data analysis procedures used in the study.

The *RUPS* instructional system, composed of 16 cumulative and sequential training units, was designed to increase the skills of educators in systematically carrying out a 5-step method of problem solving: (a) identify the problem, (b) diagnose the problem situation, (c) consider alternative actions, (d) try out a plan of action and (e) adapt the plan.

Participants are guided through a sequence of units, each consisting of a series of concept papers, group discussions and exercises. The materials were designed to develop participant knowledge and participant ability to use the *RUPS* process in identifying and diagnosing classroom-, school- and peer-related problems.

The instructional strategy of the *RUPS* system is based on a pattern of repeated diagnosis carried out in small training groups of three or six persons. The knowledge gained through this process provides the

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[1]Murray, Stephen L., Rachel L. Rassen and Stuart M. Speedie. *Research Utilizing Problem Solving: Outcome Evaluation Report.* Portland, Oregon: Northwest Regional Educational Laboratory, 1976, 154 pp.

basis for selecting and designing action plans to solve the identified problems. A simulation exercise provides opportunities for participants to practice skills in training groups and to learn to observe and improve their teamwork behaviors in a workshop setting.

The instructional system was designed for mass distribution and is available in both classroom and administrator versions. Materials include a leader's guide, participant materials, an audiotape recording and a test. The instructional strategy calls for one 27½-hour workshop and two 3-hour followup sessions held 6 to 12 weeks after training.

A limited Educational Resources Information Center search was conducted in order to identify problem-solving training packages and instructional systems that offered alternatives to *RUPS*. This limited search did not identify any alternative to the *RUPS* instructional system in the form of a complete and comprehensive prepackaged training program that emphasized both problem solving and group dynamics.

TEST SITE AND SAMPLE CHARACTERISTICS

Two test sites in the Pacific Northwest were used for the outcome evaluation of *RUPS*. All fourth-, fifth- and sixth-grade teachers at two test areas were invited to participate in the *RUPS* workshop. These teachers were offered free materials, training and paid tuition for 3 hours of graduate credit in return for their cooperation in providing necessary evaluation information.

It was originally anticipated that one major workshop site (Tacoma, Washington) would be used for the *RUPS* impact study. Recruitment was initiated in the Tacoma school district and in several school districts south of Tacoma. Because of a teacher strike, the Tacoma school district decided to withdraw from participation in the study and thus only teachers from the school districts south of Tacoma were still available. As a result of this situation, not enough teachers were left to complete the evaluation. Therefore, additional teachers were recruited from a second major site in Seattle, Washington. Arrangements were made to conduct workshops at both sites. In Tacoma, a workshop was conducted for 17 participants and in Bellevue, Washington, a second workshop was conducted for 21 participants.

The original evaluation design called for a comparison group composed of teachers randomly selected from those teachers who volunteered for *RUPS* training. However, the physical distance between the two workshop sites and the relatively small number of participants at each site precluded the use of such a group. An ITCP evaluation study involving two other experimental groups and a control group was scheduled for the Seattle area two weeks before the *RUPS* workshop. The two experimental groups were to receive training in two other instructional systems

developed by the ITCP: *Interpersonal Influence (INF)* and *Group Process Skills (GPS)*. The third group was a nontreatment control group scheduled to receive *INF* training the following spring.

Since recruitment procedures for the *GPS, INF* and control groups were essentially the same as those for the *RUPS* groups (participants for the *GPS, INF* and control groups were recruited from all fourth-, fifth- and sixth-grade teachers in the Seattle area), it was decided that the 24 teachers who were members of the nontreatment control group could also serve as the comparison group for the *RUPS* evaluation.

Analysis of a background questionnaire revealed that the *RUPS* group and the nontreatment control group were similar in terms of proportion of males to females, ages, years of teaching experience and reasons for attending the workshop. However, a somewhat higher proportion of nontreatment control group members had obtained a master's degree and had attended two or more previous NWREL workshops. The specific effects of these pretraining group differences on the outcome measures used are unknown.

TRAINEE ATTITUDES TOWARD THE SYSTEM

Participants reported high levels of satisfaction with the content and structure of the training. Participant responses to specific questions related to content and structure in the posttraining questionnaire ranged from 57 to 87 percent positive. Of the participants, 73 percent summed up their experience in the *RUPS* workshop as positive; the same proportion indicated they would recommend *RUPS* to friends with similar interests. It should be noted, however, that ratings of the workshop were slightly lower when participants were asked to make judgments on the basis of personal criteria, such as the degree to which the workshop addressed issues they thought were vital or the degree to which the workshop was successful in meeting personal expectations. Some of the questions on the followup questionnaire, which was administered 3 months after training, were identical to questions asked in the posttraining questionnaire; it was, therefore, possible to compare responses to these questions through means of uncorrelated t-tests. The results indicated that positive opinions on the content, structure and satisfaction with the workshop did not change over a 3-month period. Moreover, the tendency of participants to respond less positively when judging the workshop on personal criteria did not change. Negative changes did occur on two items: participant ratings of the success of the workshop in offering new insights and the number of participants summing up their workshop experience as positive.

Participants were questioned about the usefulness of the *RUPS* training and its applicability to their work. Immediately after the workshop, participants tended to view *RUPS* training as both useful and

applicable to their work (57 percent said they were planning to use *RUPS* as an integral part of their work). Of the participants, 79 percent saw *RUPS* as useful in work with students, 49 percent saw *RUPS* as useful in work with superiors, and 57 percent saw *RUPS* as useful in work with other teachers. The classroom version of *RUPS* was used in the training and it seems reasonable to conclude that participants found it more useful in that setting.

The identical items on the posttraining and followup questionnaires that dealt with the usefulness and applicability of the training were compared through the use of uncorrelated t-tests. The results indicated that trainees did not change their positive perceptions of the usefulness and applicability of *RUPS* training in relation to work with teachers, superiors and others. However, there was a decrease in the perceived success of the workshop in providing information with practical applications for work with students. The responses to the other items concerning the usefulness of the training remained positive over the 3-month period. The few negative changes that occurred probably reflect a more realistic understanding of the applicability of *RUPS* to the school environment in contrast to the general enthusiasm generated by the workshop. However, positive attitudes reflected in both the posttraining and the followup questionnaires suggest that participants did not receive excessive negative feedback in their attempts to employ *RUPS* techniques.

Both the observations of the evaluators who were present at each workshop site and the results of a weekly log that was filled out by trainees on a weekly basis were used to assess the significant side effects resulting from use of the system. A high degree of participant enthusiasm for the training was observed and documented at both the

conclusion of the workshop and at the followup sessions. Additionally, an examination of the weekly logs showed that *RUPS* participants tended to select for their improvement projects relatively complex problems requiring commitments of at least 30 days for completion. However, because there were no comparative data for these log entries, it is not possible to determine whether this effect is indeed due to *RUPS* training or is a reactive effect of the data-gathering instrument.

TRAINEE ATTITUDES TOWARD SELF

Correlated t-tests were performed on selected items from the post-training and followup questionnaires to determine whether the trainees' perceptions of how well they understood the concepts and their ability to apply *RUPS* skills changed during the 3-month interval. Responses to the posttraining questionnaire indicated that a majority of participants felt they understood the materials but did not feel that they could apply the skills immediately after training. Similar results were obtained on the followup questionnaire administered 3 months later. The only significant change was a positive change in the trainees' working understanding of "spotting and analyzing major results of data collected." Thus, the data indicate that trainee perceptions of their working understanding of the workshop materials and concepts were very positive when assessed immediately after the workshop and generally did not change over a 3-month period.

It was hypothesized that, as a result of the training, participants in *RUPS* would report an increased probability of their using problem-solving techniques in a variety of situations. This hypothesis was evaluated through pretraining and posttraining administration of a self-report attitude questionnaire called the Problem Solving Orientation Questionnaire (PSOQ). There was a statistically significant increase in the self-reported probabilities of engaging in task-related classroom problem solving. However, *RUPS* training apparently did not affect trainee perceptions of their own orientations toward interpersonal aspects of problem solving or nonclassroom problem solving.

The effects of *RUPS* training upon problem-solving orientations were also evaluated through a path analysis technique applied to the

RUPS group data base and the control group data base. Results of the analysis failed to support the hypothesis that *RUPS* trainees were more inclined to engage in problem-solving behavior than control group teachers. The only significant path coefficient was for age; therefore, younger teachers saw themselves as more inclinded to use problem-solving techniques in the classroom.

TRAINEE BEHAVIOR

Information compiled from the weekly logs was used to assess whether *RUPS* trainees discussed and used their problem-solving knowledge and skills in their local schools. The *RUPS* participants reported engaging in a mean frequency of 18.13 *RUPS*-like, problem-solving activities per week with students and 19.36 per week with faculty and colleagues. Apparently *RUPS* participants do use problem-solving skills in their classroom work and with faculty and colleagues. However, since no comparative data were available for interpreting these results, either from other training groups or from *RUPS* participants before their training, it cannot be determined whether these data reflect (a) training-caused changes in problem-solving behavior or (b) typical teacher performance. When working with students, participants had a tendency to use and discuss diagnostically and analytically oriented skills; when working with faculty and peers, they had a tendency to use skills that were more oriented toward generation of solutions.

CLASSROOM IMPACT

It was hypothesized that, since *RUPS* is a workshop in teacher problem solving for use in classrooms, participation in *RUPS* would lead to a change in the classroom problem-solving behaviors of teachers and thus have an impact on the classroom learning environment. Although no direct measure of teacher behavior was taken in the study, teacher attitude toward the application of problem-solving techniques was assessed through the PSOQ. Measures of the learning environment were based upon student responses to four scales in the School Activities Questionnaire (SAQ).

Data gathered from pretraining and posttraining administration of the SAQ were used to determine whether a significant change in the classroom learning environment of *RUPS* participants had taken place. Student responses on the SAQ, analyzed through correlated t-tests, did not change significantly, except for a negative change on the scale pertaining to reinforcement of self-concept.

Not only did evaluators examine changes in the learning environment through correlated t-tests, they also used a path analysis technique in order to test a model that assumes the learning environment is determined by background variables (e.g., age of teacher, sex of teacher and class size), training in *RUPS* and teacher attitude toward the application of problem-solving techniques. The background variables in this model were used strictly for control purposes, and therefore their relationships to the learning environment do not have much evaluative utility. However, the effect of *RUPS* training on the learning environment has direct evaluative utility and the impact of teacher

attitude on application of problem-solving techniques had indirect evaluative utility. In the latter case the assumption is that teacher attitude toward application is an expected outcome of training, and, to the degree that it is related to the learning environment, it is of indirect evaluative utility. If training does have an impact on teacher attitude and the learning environment and if teacher attitude is related to the learning environment, the analysis of teacher attitude in terms of its indirect evaluative utility is straightforward. When training does not have an impact on teacher attitude or the learning environment, even though teacher attitude relates to the learning environment, the evaluative utility of findings are more difficult to analyze. In this case, although it cannot be said that training was effective, it can be said that relationships among the outcome variables do partially confirm the model used to evaluate the training.

The data failed to support the hypothesis that training affected either teacher attitude, as measured by the PSOQ, or the classroom learning environment, as measured by the SAQ. Since significant path coefficients linking teacher attitude to the learning environment (as measured by three SAQ scales) were produced, some support was found for the hypothesis that teacher orientation toward problem solving is related to student perception of the classroom learning environment. The three scales used were: classroom participation, individualization of instruction and democratic classroom control. (The low reliability of the fourth SAQ scale precluded its use in this analysis.)

In the data collected for this study, there is no evidence of behavioral changes that have an impact on secondary audiences which may be attributed to *RUPS* training. Although the participants did see

themselves as using and discussing their problem-solving skills with students and peers and did express a high degree of satisfaction with the training, there is no evidence to support the conclusion that their postworkshop behavior was different from their preworkshop behavior or the conclusion that, if their behavior was indeed different, it had a measurable impact on the secondary audiences in terms of the aspects of learning that were measured in this study.